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Family Economics and Nutrition Review

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Family Economics and Nutrition Review is written and published each quarter by the Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, Washington, DC.

The Secretary of Agriculture has determined that publication of this periodical is necessary in the transaction of the public business required by law of the Department.

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Family Economics and Nutrition Review is for sale by the Superintendent of Documents. Subscription price is \$10.00 per year (\$12.50 for foreign addresses). Send subscription orders and change of address to Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. (See subscription form on p. 60.)

Original manuscripts are accepted for publication. (See "guidelines for authors" on back inside cover). Suggestions or comments concerning this publication should be addressed to: Joan C. Courtless, Editor, *Family Economics and Nutrition Review*, Center for Nutrition Policy and Promotion, USDA, 1120 20th St., NW, Suite 200 North Lobby, Washington, DC 20036. Phone (202) 606-4816.

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Factors Contributing to Household Food Insecurity in a Rural Upstate New York County

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Anne Kendall

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To identify factors contributing to household food insecurity in a rural county in upstate New York, two personal interviews were conducted with 193 women who were between the ages of 20 and 40 years, had less than 16 years of education, and had children living at home. Data were collected on sociodemographic characteristics, risk factors for food insecurity, food program participation, the Radimer/Cornell hunger and food insecurity measures, and household food supplies. Regression analyses and tree-based partitioning were used. Variables significantly ($p < 0.05$) contributing to food insecurity were being a single parent, lack of savings, larger household size, having unexpected expenses, adding \$50 or more to food stamps to purchase sufficient food, and low food expenditures. Variables contributing to low levels of household food supplies were low educational level, low food expenditures, not having a vegetable garden, and not receiving free milk, eggs, and meat. These results will help improve development and targeting of interventions to alleviate food insecurity.

Food insecurity is now a recognized public policy concern for food-rich countries such as the United States, as well as a development concern for poorer countries around the world (11, 24). Furthermore, a consensus is emerging around the American Institute of Nutrition (AIN) definition of food insecurity as “when-ever the availability of nutritionally adequate and safe foods or the ability

to acquire acceptable foods in socially acceptable ways is limited or uncertain” (1). This definition is becoming widely used for policy relevant nutrition research in the United States and is consistent with the definition of food insecurity used in this paper.

Using both qualitative and quantitative research methods, Radimer and colleagues have developed a definition of food insecurity, a conceptual framework,

and the Radimer/Cornell hunger and food insecurity measures (see box, p. 4) relevant for food-rich countries (14, 15, 16). The validity of these measures for identifying groups of households that are experiencing food insecurity is now established (8). Very recent research indicates that the household-level food insecurity measure has a sensitivity of 89 percent and a specificity of 63 percent that can be improved to 71 percent with the elimination of one item in the measure (6). Thus, the household-level food insecurity measure correctly identifies 89 percent of the households that are truly insecure as insecure and correctly identifies 71 percent of the households that are secure as secure.

Given the previous lack of a validated measure of household-level food insecurity, it is not surprising that few studies have examined the factors contributing to food insecurity in populations living in relatively food-rich countries. Recently, Campbell (2) elaborated a conceptualization of food insecurity and its risk factors. She defines risk factors for food insecurity as anything that limits either household resources (money, time, information, health, etc.) or the proportion of those resources available for food acquisition.

The conceptual framework outlines the relationship of household resources to food acquisition and food insecurity. The present study draws on this conceptual framework and examines social and demographic characteristics that influence a household's level of resources, as well as the household's level of resources in relation to food insecurity. In addition, this study examines variables that measure food acquisition by the household and are influenced by socio-demographic characteristics and economic resources and relate to household food

supplies and the experience of food insecurity.

For this study, a rural population was selected because, as Deavers and Hoppe (4) point out, the overall poverty rate is higher in rural than urban areas. In addition, the rural poor have fared relatively badly since 1980 as the economic performance of rural areas has lagged behind that of the rest of the Nation. In 1993, when the study reported here was conducted, the non-metropolitan poverty rate was 17.2 percent while the metropolitan poverty rate was 14.6 percent (25).

Morris, Neuhauser, and Campbell (12) have examined three factors that may limit food acquisition and therefore contribute to food insecurity in rural areas: Limited supermarket availability, limited food item availability, and higher relative costs of the USDA Thrifty Food Plan (TFP) market basket of foods. Using a random sample of persistently poor rural counties, the investigators found 3.8 supermarkets per county in rural America versus 29 in urban America. Fresh fruits, vegetables, and meats were very limited in the small and medium stores that are more common in rural areas. The average cost of the TFP market basket was \$102 in small and medium stores and \$81 in supermarkets in rural areas. The picture that emerges from these findings is one of limited access to supermarkets, and as a consequence, decreased availability of fresh foods, an increased cost of food, and ultimately an increased risk for food insecurity.

Additional factors may contribute to food insecurity in rural areas. Rank and Hirschl (17) have shown that qualified families in rural areas are much less likely to participate in food assistance

programs such as food stamps than their urban counterparts. These researchers found adverse attitudes toward welfare and lack of accurate information as two of the underlying mechanisms explaining low food stamp participation rates in rural areas. These studies indicate that food acquisition may be constrained in rural areas and that these constraints may increase households' risk of food insecurity.

The objectives of the research reported here were: (1) to identify the social, demographic, and economic characteristics of households that contribute to food insecurity; (2) to identify the food acquisition characteristics of households that contribute to food insecurity; and (3) to analyze the interrelationships between these two sets of factors, as well as the use of coping tactics by food insecure households. Overall, this research aimed to increase the general understanding of food insecurity in order to facilitate the development of more effective interventions to address the problem and to improve targeting of interventions to subgroups in the population with the problem.

Methods

Population

The study took place in a rural county of upstate New York that had a population of 60,517 in 1990 (5). Nearly 77 percent of the population of this county live in places with fewer than 2,500 people. In 1990, the unemployment rate of the county was 5.8 percent; per capita income was \$15,503; and the percentage of families in poverty was 12.6 percent. This county was below both the mean unemployment rate and the poverty rate for similar counties in upstate New York.

Selection of the Sample

A survey of women with children living in their household was conducted in this county between January and July 1993. A sample of approximately 200 women was desired because previous research found statistically significant relationships between risk factors and food insecurity with a sample size of 189 (16). The sampling frame was a 1989 health census of the county that had a participation rate of 86 percent. Women over the age of 40 and those with 16 or more years of education were excluded, resulting in 3,433 women who were eligible for the study. Since it was anticipated that changes in the county's population had taken place since the health census was completed, a pool of 639 women was selected from the census.

Six strata were formed based on the demographic characteristics available from the census most strongly associated with low socioeconomic status: first, whether potential subjects did or did not have a telephone; and then, whether they had private health insurance, Medicaid insurance, or no health insurance. Each of the six strata was further stratified into five age groups: 15-19, 20-24, 25-29, 30-34, and 35-39 years.

Fifty-two percent of the women (331) could not be located within the county despite intensive efforts. The remaining 308 women were contacted by telephone or, for those with no phones, at their homes to request their participation and set up interviews. Two hundred women agreed to participate in the survey. Refusal rates were 18 percent in the strata presumed to be the lowest income group (those having no telephone and either Medicaid or no health insurance), 40 percent in the 15 intermediate strata, and 32 percent in the 5 highest strata (those with a telephone and

The Radimer/Cornell Hunger and Food Insecurity Items

1. I worry whether my food will run out before I get money to buy more.
2. The food that I bought just didn't last, and I didn't have money to get more.
3. I ran out of the foods that I needed to put together a meal and I didn't have money to get more food.
4. We eat the same thing for several days in a row because we only have a few different kinds of food on hand and don't have money to buy more.
5. I am often hungry, but I don't eat because I can't afford enough food.
6. I eat less than I think I should because I don't have enough money for food.
7. I can't afford to eat properly.
8. My child(ren) is/are not eating enough because I just can't afford enough food.
9. I know my child(ren) is/are hungry sometimes, but I just can't afford more food.
10. I cannot give my child(ren) a balanced meal because I can't afford that.

Response categories for items 1 through 10 are "not true," "sometimes true," or "often true." "Sometimes true" and "often true" are grouped together for analytical purposes to indicate a positive response or the presence of food insecurity.

private health insurance). Because only 7 of the 200 women fell into the 15-19 age category, they were dropped from the analysis.

Data Collection

Each respondent was interviewed twice in her home. During the first interview, a questionnaire was administered and an inventory of household food supplies was conducted by trained field workers. The questionnaire obtained information on sociodemographic characteristics, methods of obtaining food, food program participation, household expenditures, and the Radimer/Cornell hunger and food insecurity items (see box). At the second interview, approximately 3 weeks later, the household food inventory was repeated.

The survey instrument was pretested in a sample of 20 low-income women and afterwards a number of categories on the food inventory instrument were revised to better differentiate household food supplies. The study protocol was approved by the Cornell University Human Subjects Committee and informed consent was given by all respondents prior to participation in the study. Each respondent received \$20 as compensation for participation.

Measurement of Dependent Variables

This study used two dependent measures of food insecurity. The first was the previously validated Radimer/Cornell hunger and food insecurity measures index (8). Since household-level food insecurity was the focus of this study, any household that had a positive response

to one or more of the questions was defined as insecure. The remaining households were defined as food secure.

The second dependent measure of food insecurity was household food supplies as measured by a household food inventory. Food supplies are potentially a physical measure of food insecurity and have been shown to be strongly associated with food insecurity (8). Since in this population only 9 percent of all food expenditures are for food eaten outside of the home, household food supplies seem to reasonably represent the food available for consumption.

The instrument used to measure household food supplies was based on methods used by Sanjur et al. (19) and Crockett et al. (3). Field workers coded the presence of 51 food items in the household into one of four categories, with zero indicating none of the food was present and three indicating a large amount was present. Item-specific response categories were determined based on the weight or volume of each item as purchased and judgments of differences that would be meaningful and differentiate those with depleted food supplies from those with replete food supplies. These scores were then summed over the 51 items, and the two inventories were averaged to create a measure of food supplies that could range from 0 to 153. The food inventory was normally distributed, with a range of 19 to 115.5 and a sample mean of 71.06.

Measurement of Contributing Factors

The sociodemographic and economic risk factors contributing to food insecurity considered in this analysis were (table 1): Annual income (in six categories: <\$5,000, \$5,000-\$10,000, \$10,000-\$15,000, \$15,000-\$20,000, \$20,000-\$25,000, >\$25,000), whether the income in past

year was less than usual, whether income dropped over the year, presence of monthly variation in income, household size (number of people eating from the same food supply), respondent's educational level, whether the household was headed by a single parent, respondent's employment status and spouse's employment status, presence of savings, and home ownership.

Food acquisition variables considered were: Receipt of food stamps, adding more than \$50 to food stamps,¹ total household expenditures (sum of rent/mortgage, school and real estate taxes, utilities, car payments, car repair costs, car insurance and gasoline expenses, daycare expenses, medical insurance and other medical expenses, and food expenses for food eaten at home and away from home), food, housing, and car expenditures (each expressed separately as a dollar amount and as a percent of total expenditures), presence of unexpected expenses within the last year, presence of medical expenses (other than insurance) within the last year, limits on store choice because of transportation and/or store availability, use of a food buying club, whether food was obtained from vegetable gardening and hunting or fishing, frequency of receipt of free milk, eggs, or meat, and frequency of shopping.

The coping strategies considered were: Frequency of borrowing money for food, eating with friends and relatives, food being brought by friends and family to the respondent's household, using a food pantry, and whether commodity foods were used.

¹This variable measured the sufficiency of food stamps to meet the family's food needs.

Food supplies are potentially a physical measure of food insecurity and have been shown to be strongly associated with food insecurity.

Table 1. Characteristics of food secure and food insecure households

Characteristic	Food secure (n = 90)	Food insecure (n = 103)	p value
<i>Percent or mean</i>			
Sociodemographic and economic factors			
Income			<0.001
<\$5,000	4	10	
\$5,000 - \$10,000	7	27	
\$10,000 - \$15,000	12	14	
\$15,000 - \$20,000	9	11	
\$20,000 - \$25,000	17	12	
>\$25,000	51	25	
Income last year less than usual	16	26	<0.05
Income dropped in year	33	48	0.01
Income same monthly	23	38	0.005
Household size	4.37	4.30	<0.10
Education			<0.01
Less than high school	12	19	
High school graduate	40	46	
Some college or technical training	25	27	
College graduate	22	8	
Single-parent household	8	29	<0.001
Respondent employed	71	59	<0.05
Spouse employed	82	64	<0.001
Have savings	69	28	<0.001
Own or buying home	76	61	<0.01
Food acquisition variables			
Receive food stamps	6	33	0.001
Add \$50 or more to food stamps	2	20	<0.001
Household expenditures	\$17,617	\$13,613	<0.001
Food expenditures	\$4,657	\$3,881	<0.01
Housing expenditures	\$6,435	\$5,438	<0.05
Car expenditures	\$4,779	\$3,056	<0.005
Food/total expenditures	0.28	0.32	<0.05
Housing/total expenditures	0.38	0.41	NS
Car/total expenditures	0.25	0.20	<0.01
Unexpected expenses in last year	44	56	<0.05
Medical expenses in last year	82	65	<0.001
Shop at store because			
Only store in area	19	20	NS
No transportation	3	8	<0.05

table continues

Table 1. Characteristics of food secure and food insecure households

Characteristic	Food secure (n = 90)	Food insecure (n = 103)	p value
<i>Percent or mean</i>			
Belong to buying club	15	16	NS
Vegetable garden for food	63	55	NS
Hunt or fish for food	53	53	NS
Receive free eggs, milk, or meat	27	21	NS
Frequency of major grocery shopping			<0.05
Once a week or more	34	23	
Once every 2 weeks	42	38	
Once every 3 weeks	6	8	
Once a month	17	29	
Coping strategies			
Frequency of eating meals at friends or family			NS
Never	11	14	
Hardly ever	30	33	
Less than once a month	18	8	
Once a month	22	22	
More than once a month	18	22	
Frequency of family or friends bringing food			0.05
Never	56	48	
Hardly ever	28	32	
Less than once a month	7	7	
Once a month	6	3	
More than once a month	2	10	
Frequency of borrowing money for food from family or friends			0.001
Never	87	57	
Hardly ever	13	30	
Less than once a month	0	7	
Once a month	0	4	
More than once a month	0	3	
Frequency of using a food pantry			0.001
Not applicable	44	37	
Never	38	24	
Hardly ever	15	29	
Less than once a month	2	1	
Once a month	1	10	
Use surplus or commodity foods	39	60	0.001

NS = $p > .10$.

Tree-based partitioning... selects variables in a sequence, choosing at each step the independent variable that best distinguishes the classes of a categorical dependent variable (classification tree analysis) or the level of a continuous variable (regression tree analysis).

Statistical Analysis

The first step in the statistical analysis was to compare the food insecure and food secure households on each of the independent variables. Chi-square analysis was used for categorical variables and t-tests for continuous variables.

The second step was to select the best predictors from the many variables available. The selection process was based on Campbell's (2) conceptual framework, other theoretical justifications outlined below, and statistical analysis. Using logistic stepwise regression within SAS (20), specific variables were selected from within each of the major conceptual areas of Campbell's framework as follows: (1) the social, economic, and demographic variables only; (2) the food acquisition variables only; and (3) both the social, economic, and demographic and food acquisition variables.

A variable was selected to be added and stay in the model if it had an F statistic significant at the 0.05 level. If a variable was selected in any of the three analyses, it was included in the final models.

Linear stepwise regression was used similarly to select a subset of the best predictors of household food supplies. Any variable chosen for food insecurity or household food supplies was included in the final models for both dependent variables.

In the variable selection analyses, household financial resources were operationalized both as income and total household expenditures, since in low-income families expenditures may more accurately characterize financial resources than income (21). When the total household expenditure variable was chosen for inclusion in the model, income was

not included. Similarly, the food expenditure variable was operationalized both as total annual food expenditures and food expenditures as a proportion of total expenditures. When food expenditures as a proportion of all household expenditures was included in the model, total food expenditures was not included. The final models presented here include income and total annual food expenditures. Income level and household size were included in the final models even if these variables did not survive the selection procedure.

The third step was to create the final logistic and linear regression models. To address the objective of analyzing the interrelationships among subsets of variables, four logistic and linear regression models were estimated for each of the dependent variables (food insecurity and household food supplies, respectively) using the selected variables: (1) the subset of sociodemographic and economic variables alone; (2) the subset of food acquisition variables alone; (3) the sociodemographic and economic and the food acquisition variables together; and (4) the variables in model number three with the addition of the coping strategies.

To identify characteristics of households that contribute to food insecurity, results from the logistic regression model three are expressed as odds ratios with associated 95-percent confidence intervals (CI). An odds ratio (OR) is a measure of association and indicates the probability that a household with a certain characteristic (or value on the independent variable) will be food insecure divided by the probability that it will not be food insecure (7). The ratio resulting from logistic regression analysis compares the odds for two different values of the independent variable and

can take on any value from 0 to infinity with a value greater than 1 indicating that the risk of being food insecure is greater when the household has the characteristic (positive association). A value between 0 and 1 indicates that the risk of being food insecure is less when the household has the characteristic (negative association). An odds ratio was considered statistically significant if 1 was not in the CI.

Results from the linear regression model three are expressed as regression coefficients with 95-percent confidence intervals. The coefficient resulting from linear regression can take on a value from negative to positive infinity. Negative values indicate an inverse or negative association and positive values indicate a positive association of the variable with household food supplies. A coefficient is significant if 0 is not in the CI.

Finally, to provide insight into possible interactions among the most useful variables for distinguishing food secure and insecure households and for predicting food supplies, tree-based partitioning analysis called S-Plus was used (23, 26). Tree-based partitioning is particularly useful when complicated interactions that cannot be modeled by usual regression methods are expected. This statistical procedure selects variables in a sequence, choosing at each step the independent variable that best distinguishes the classes of a categorical dependent variable (classification tree analysis) or the level of a continuous variable (regression tree analysis). An independent variable can be included in the tree more than once and may have different cut-off points each time.

After the tree is constructed, it can be pruned using various criteria to create a simpler, more easily interpretable, and

more generalizable tree. We used classification tree analysis to construct a tree for food insecurity and regression tree analysis to create a tree for household food supplies. We considered only the independent variables included in the final logistic and linear regression models in our original tree construction. In this paper, we show the trees down to the level of variables found to be statistically significant in the final models of the logistic and linear regression analyses.

Results

Table 1 shows the characteristics of food secure and insecure households for each of the independent variables in this study. On the sociodemographic and economic factors, the two groups differed significantly in the expected direction on all independent variables. For the food acquisition variables, again the two groups differed in the expected direction on many of the variables. For example, food insecure households were more likely to receive food stamps and to add \$50 or more per month to their food stamps to buy food for the household, but their annual dollar expenditures for food

were less than those of food secure households.

The two groups did not differ from each other on several strategies for acquiring food at low cost such as belonging to a food buying club, vegetable gardening, hunting and fishing, and receiving eggs, milk, and meat from friends or relatives free or as in-kind pay for agricultural work. Interestingly, approximately 20 percent of both groups reported they shopped where they did because it was the only store in the area; and while transportation constraints on food shopping were reported by substantially fewer respondents, the two groups differed significantly on this variable. On the coping strategy variables, food insecure households made significantly more frequent use of all means listed except eating meals with friends and family. Food insecure households were significantly more likely to have used surplus or commodity foods than food secure households.

Table 2 presents the results of the models for food insecurity that included various subsets of variables. The model with

Table 2. Proportion of variance accounted for by models with various subsets of variables

Model	Food insecurity area under ROC ¹ curve	Food supplies R ²
Sociodemographic and economic factors	0.77	0.26
Food acquisition variables	0.74	0.31
Sociodemographic, economic, and food acquisition	0.81	0.41
Sociodemographic, economic, food acquisition, and coping strategies	0.83	0.43

¹Receiver operating characteristic.

only the subset of the sociodemographic and economic variables had an area under the receiver operating characteristic (ROC) curve of 0.77. The area under an ROC curve can be interpreted like an R^2 . The ROC area ranges from 0.5 (i.e., chance) to 1.0 and refers to the probability that the logistic regression model correctly orders pairs of food secure and insecure households. When the selected food acquisition variables were considered separately, the area under the ROC curve was 0.74 and with both sets of variables, the value was 0.81. The addition of the selected coping strategies resulted in an area under the ROC curve of 0.83, not a substantial increase. Sociodemographic and economic factors accounted for almost the same amount of variance in the outcome as the food acquisition variables, and the two sets taken together did not account for considerably more of the variation in food insecurity than did either set alone.

Table 2 also presents the results from the linear regression analysis for household food supplies. The subset of sociodemographic and economic variables explained 26 percent of the variance in food supplies and the food acquisition variables explained 31 percent of the variance. When both subsets of variables were included together, more of the variance was explained, 41 percent, than with each separately, indicating that they both make independent contributions to the explanation of food supplies. The addition of coping strategies added only 2 percentage points to the explained variance. Based on the two sets of results, coping strategies were not included in the final models identifying factors contributing to food insecurity.

Table 3. Odds ratios and 95-percent confidence intervals for factors contributing to food insecurity

Variable	Odds ratio	Confidence limits	
		Lower	Upper
Sociodemographic and economic factors			
Income ¹	0.988	0.788	1.238
Savings	0.321	0.168	0.611*
Own/buy home	1.103	0.550	2.212
Income same in year	1.202	0.635	2.277
Education ¹	0.849	0.609	1.182
Single parent	3.707	1.355	10.139*
Household size	1.363	1.027	1.810*
Respondent employed	0.894	0.465	1.716
Food acquisition variables			
Receives food stamps	0.646	0.181	2.308
Add \$50 or more to food stamps	6.333	1.464	27.400*
Medical expenses	0.771	0.345	1.723
Unexpected expenses	2.317	1.269	4.231*
Vegetable gardening	0.918	0.477	1.767
Free milk/eggs	0.862	0.433	1.715
Food expenditures	0.973	0.957	0.990*

*Statistically significant at $p < 0.05$.

¹Treated as continuous variables in the analysis.

Table 3 presents the odds ratios with 95 percent CI for the sociodemographic and economic factors as well as the food acquisition variables associated with food insecurity. These were derived from the multivariate logistic regression analysis of model 3 using the Radimer/Cornell measure of food insecurity as the dependent variable. Among the sociodemographic and economic factors, women with savings were much less likely than those without to report food insecurity (OR=0.32, CI=0.17, 0.61). Women in single-parent households

were more likely to be food insecure (OR=3.71, CI=1.36, 10.14). Women in larger households were also more likely to be food insecure (OR=1.36, CI=1.03, 1.81). Among the food acquisition variables, those women who added \$50 or more money to food stamps were more likely to be food insecure (OR=6.33, CI=1.46, 27.4) as were women whose households experienced unexpected expenses within the last year (OR=2.32, CI=1.27, 4.23). Food expenditures were lower in food insecure households (OR=0.97, CI=0.96, 0.99).

Table 4. Regression coefficients and 95-percent confidence intervals for factors contributing to household food supplies

Variable	Regression coefficient	Confidence limits	
		Lower	Upper
Sociodemographic and economic factors			
INTERCEPT	35.936	19.988	51.884
Income	0.364	-1.542	2.270
Savings	5.610	-0.099	11.318
Own/buy home	5.693	-0.180	11.566
Income same in year	1.285	-4.170	6.741
Education	4.134	1.368	6.899*
Single parent	4.980	-2.947	12.908
Household size	1.421	-0.856	3.699
Respondent employed	-0.639	-6.113	4.836
Food acquisition variables			
Receives food stamps	2.969	-7.906	13.844
Add \$50 or more to food stamps	-7.770	-16.570	1.031
Medical expenses	5.235	-1.355	11.825
Unexpected expenses	-0.293	-5.342	4.755
Vegetable gardening	8.154	2.669	13.639*
Free milk/eggs	8.798	2.985	14.612*
Food expenditures	0.244	0.114	0.374*

*Statistically significant at $p < 0.05$.

Table 4 presents the regression coefficients (RC) and 95 percent CI for household food supplies. Education was the only social, demographic, or economic factor associated with food supplies. Women with more education had significantly larger food inventories (RC=4.13, CI=1.37, 6.90). Among the food acquisition variables, those women who spent more on food (RC=0.24, CI=0.11, 0.37), had vegetable gardens (RC=8.15, CI=2.67, 13.64), or received

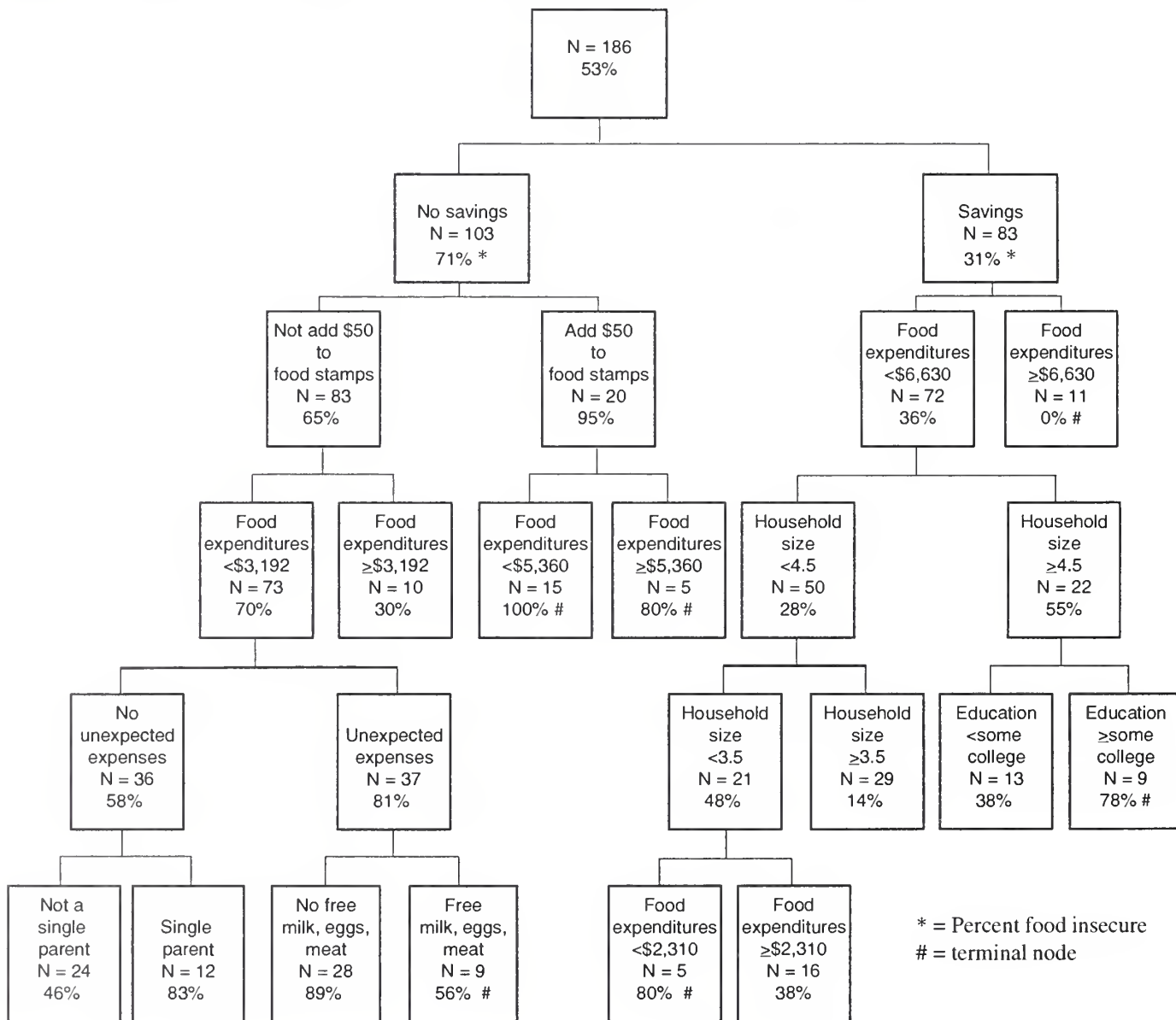
free milk, eggs, or meat (RC=8.80, CI=2.98, 14.61) had larger household food inventories than those without these characteristics. Several other variables approached statistical significance ($p < 0.10$). Having savings and owning a home approached significance as factors related to greater food supplies. Women who added \$50 to food stamps had smaller household food supplies than those who did not do so.

The interactions between the independent variables as well as their relative importance are indicated in the results from the tree analysis. Figure 1 presents the classification tree for household food insecurity. Only a portion of the full tree is presented. The full tree is available from the authors. The tree had an overall misclassification rate of 16 percent. This degree of misclassification allowed for the production of a tree that was understandable and acceptably accurate.

As can be seen, if the household had savings, it was much less likely to be food insecure than if it didn't (31 percent vs. 71 percent). Among the group with no savings, adding \$50 or more to food stamps was the next variable selected. Ninety-five percent of those who added this amount of money or more to their food stamps to feed their family for the month were food insecure, whereas 65 percent of those who didn't were insecure. Among both of these groups, annual food expenditures was the next variable selected. Generally, lower food expenditures were associated with greater food insecurity. To continue on down the tree, among those who did not add \$50 or more to food stamps and had annual food expenditures of less than \$3,192, and had unexpected expenses, 81 percent were food insecure.

To move to the other side of the tree and examine those who had savings and were food insecure, annual food expenditures was the first variable selected. Among those with annual expenditures less than \$6,630, 36 percent were food insecure whereas among those with greater expenditures, no one was food insecure (fig. 1). In the group with expenditures less than \$6,630, 55 percent of those with a household size

Figure 1. Classification tree for food insecurity (Radimer/Cornell Measure)



greater than 4.5 were insecure. And following along those in this group, among those with some college or greater education, 78 percent were insecure.

Regression tree analysis was used to identify the characteristics of households with higher food supplies. The first variable selected was annual food expenditures. Fifty-five of 180 households spent less than \$3,192 annually on food and had a mean inventory score of 61.1 compared with a score of 74.8 for those who spent more than that amount. Overall, the important variables in predicting household food supplies among those with annual food expenditures of less than \$3,192 were home ownership and income level. Owning a home and having an income above \$20,000 were consistently associated with larger food supplies, 69.0 versus 51.5 and 66.2 versus 47.8, respectively.

Among the food insecure with food expenditures greater than \$3,192, educational level of the respondent, whether she added \$50 or more to food stamps to feed the family for the month, and whether the household had a vegetable garden were the important variables. Those respondents with greater than some college had a mean food inventory score of 82.5 versus 70.3 among those with less education. Among those with less education, respondents who added \$50 or more to their food stamps had a mean inventory score of 57.1 versus 73.1 for those who didn't. Among those with more education, respondents who did not have a vegetable garden had a mean score of 73.3 versus 88.5 for those who did.

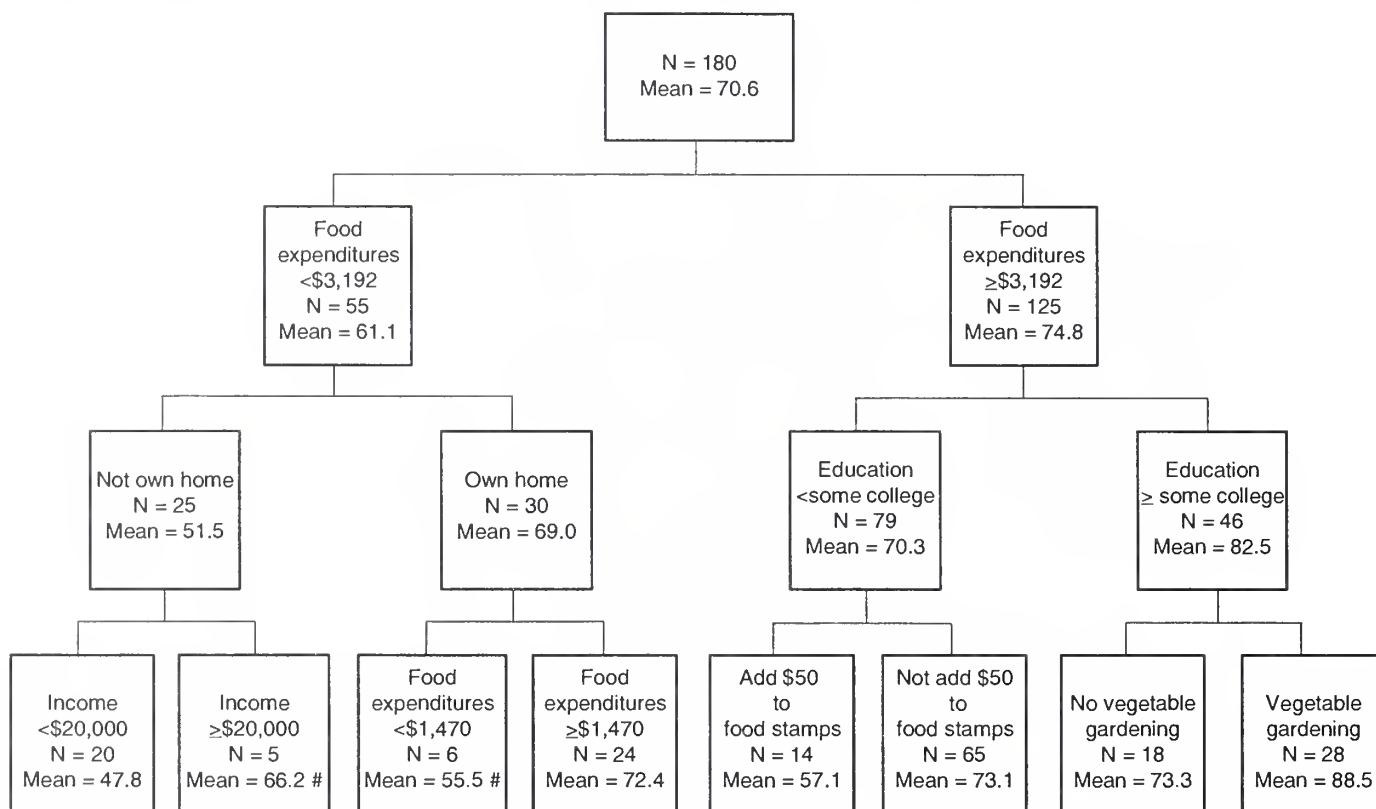
Discussion

This paper is among the first to examine factors contributing to food insecurity using a validated direct measure of food insecurity, as well as a physical measure of food insecurity, household food supplies. The descriptive results in table 1 are similar to those in a recent paper from Rose, Basiotis, and Klein (18) describing the correlates of food insufficiency from USDA's 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII). They found higher rates of food insufficiency among households with these characteristics: Low income, renting a home, single-head of household, low educational level, six or more people in the household, and minority race or ethnicity. These authors carefully point out that their results are descriptive and do not control for underlying factors.

A positive aspect of the multivariate logistic and linear regression analyses presented in this paper is the control for underlying factors. When this was done, a fairly consistent picture of the factors contributing to food insecurity emerges across the two dependent measures. Measures of wealth, such as having savings and owning a home, were related to decreased risk of food insecurity. Economic insecurity and limited income earning potential, operationalized as being in a single-parent household and having a lower educational level, were related to increased risk of food insecurity. Lower levels of food expenditures and having unexpected expenses were consistently associated with increased risk of food insecurity. This latter finding indicates that it is not only the level of household financial resources that is important for food security, but it is also their certainty.

...it is not only the level of household financial resources that is important for food security, but it is also their certainty.

Figure 2. Regression tree for household food supplies



Senauer, Asp, and Kinsey (21, p. 218) state, “Lack of food security and inadequate diets among the poor are primarily a direct result of inadequate income to buy sufficient food.” Income, operationalized as a six-category variable, was not significant in the regression analysis. We believe this may have happened for two reasons: first, food expenditures are a more immediate (proximal) predictor of food insecurity and the level of food expenditures is determined by income. So when the food expenditure variable is in the model, it may mask any effect of income on food insecurity. Second, this finding may be a result of the way income was measured in this study.

Support for this assertion is that when total household expenditures was used as the variable to operationalize the concept of household financial resources, this variable was significant ($p < 0.05$), and food expenditures as a proportion of total expenditures was not significant. Senauer, Asp, and Kinsey (21) note that total consumer expenditures may be a better indicator of a household’s permanent income than current annual income, especially in low-income households. So household income, whether current or permanent, is very likely an important influence on household-level food insecurity even if current income was not significant in the multivariate analyses shown in this paper.

Among the food acquisition variables examined, total annual food expenditures was strongly and consistently associated with food insecurity and food supplies. Food insecure households spent about 83 percent of what food secure households spent on food. Food expenditures accounted for 32 percent of total household expenditures for food insecure households compared with 28 percent for food secure households. In analyzing food expenditures for 1980 to 1988, USDA analyst James Blaylock (13) has shown that food expenditures among the poorest one-fifth of Americans have declined 13.1 percent while they have grown by 2.7 percent in the wealthiest one-fifth of the population.

During this period, growth in annual income level was stagnant for the poorest quintile, so that in 1990, this group was spending 42 percent of their income for food, compared with 14 percent for the average household (9). The food insecure households in this study may well be spending as much as they can on food, and this amount is not sufficient to make them food secure.

Lino (10) recently found food stamps to be the most common income source among poor families with children. In his study, 69 percent received food stamps, and the program provided one-fifth of these households' annual income. Lino (10) states, "Probably more than any other program, food stamps provides a safety net for poor households." Although participation in the food stamp program is very low in this study, Lino's contention is supported by the consistent association of the insufficiency of food stamps for meeting family food needs and food insecurity.

In this sample, among households who received food stamps, those who added \$50 or more in cash to their food stamps to buy food for the household for the month were more likely to be food insecure and to have lower household food supplies. We are inclined to evaluate this finding as real not only because of the consistency in the result across the two methods but also because we did the analysis with the independent variable operationalized as "whether food stamps lasted the whole month" and found the same result.

An interesting finding from this study that may only be relevant to food access in rural areas is the positive association of vegetable gardening with household food supplies. Likewise, receiving milk,

eggs, and meat free or as in-kind payment for agricultural labor had a positive association with household food supplies. This finding points to the importance of household production in food security. However, Shotland and Loonin (22) note that family gardens may have only limited potential for solving problems of food insecurity in this population subgroup because of the limited land available for gardening and the high cost of inputs such as seed, fertilizer, and insecticides. Poor families may be reluctant to risk their limited financial resources on a garden.

In addition to identifying factors contributing to food insecurity, this research aimed to understand how these factors interrelate, thus providing insight into the nature of food insecurity. Results from both the staged regression analysis and the tree analysis provide useful insights. Clearly, the sociodemographic and economic characteristics of households explain a substantial proportion of the variance in food insecurity measured both ways. These characteristics will be helpful in identifying segments of the population to target for interventions. But the results also show that food acquisition factors explain additional variance, particularly in household food supplies. Two food acquisition variables, food expenditures and having to add \$50 or more to food stamps, appear to be particularly important as they enter the tree analysis near the top of the tree.

Coping strategies did not add substantially to the proportion of variance explained in either dependent variable when the other two groups of variables (sociodemographic factors and food acquisition variables) were in the model. Thus, coping tactics appear to be coincident with food insecurity

rather than factors that contribute to or protect against food insecurity. More research on how coping tactics relate to both food insecurity and its risk factors and consequences is warranted.

The tree analysis indicates that with information on only a very few variables, a program manager could be confident that a household was food insecure. Ninety-five percent of the households that had no savings and added \$50 or more to food stamps were food insecure (fig. 1). Furthermore, the tree analysis offers insight into the relative importance of a variable such as single parenthood that was identified as significant in the regression analysis. While being a single parent is a risk factor for food insecurity, it is most important for those having no savings, who don't add \$50 or more to their food stamps, have low food expenditures, and no unexpected expenses (fig. 1). It does not appear to be a risk factor for those households with savings and higher levels of food expenditures.

The results found here may be unique to counties similar to the one studied here. This county is typical of "rural-urban" counties in New York State according to Ebert's (5) classification scheme. This type of county has a population of less than 200,000 people, the largest place is greater than 10,000 people and there is minimal commuting from the county to a large urban center. Counties of this type include one-third of the population of the 44 rural counties of New York State. The rural counties in the United States to which these results are applicable are likely to be in the northern half of the country with a predominantly white population and some agricultural production. Further research of this type with an urban population is needed.

Conclusion

This study identified factors contributing to food insecurity in a rural population based on Campbell's (2) conceptual framework of food insecurity and its risk factors. These include lack of savings, low educational level, low income, and unexpected expenses—all factors that decrease household resources in Campbell's framework. In addition, having to add \$50 or more to food stamps to feed the household (an indicator of the sufficiency of food stamps) and lower levels of food expenditures—factors that decrease food acquisition in Campbell's model—contributed to food insecurity. Households with these characteristics should be given priority in intervention programs that address food insecurity. Furthermore, interventions should be designed to address these food acquisition characteristics as well as other factors related to expanding food acquisition such as vegetable gardening.

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Do Food Bars Measure Up? Nutrient Profiles of Food Bar Versus Traditional School Lunches in the CATCH Study

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The nutrient content of food bars versus traditional school lunch menus is compared using data from 16 elementary schools that participated in the Child and Adolescent Trial for Cardiovascular Health (CATCH). Results show that food bars offered as complete National School Lunch Program reimbursable lunches provide less total energy (641 kcal vs. 727 kcal) and more energy from fat (40.3 percent vs. 35.4 percent) and saturated fat (16.3 percent vs. 14.0 percent) than traditional lunches. Sodium in the two types of lunches did not differ, exceeding national recommendations in each. Partial food bars offered by 24 schools in place of the traditional vegetable/fruit meal component (as offered in 72 schools) are a higher total fat (6.5 g vs. 3.8 g) and similar saturated fat (1.0 g vs. 1.2 g) alternative. Food bars analyzed in this study are not necessarily lower in total fat, saturated fat, or sodium than traditional lunches. Strategies for modifying food bars need to be emphasized as schools work to meet the nutrition goals of the U.S. Department of Agriculture's School Meals Initiative for Healthy Children.

Despite the many nutritional benefits of the National School Lunch Program (NSLP) (5,10,11), elementary school lunches continue to be high in fat (37-41 percent of calories), saturated fat (14-18 percent of calories), and sodium (1,100-1,400 mg) (3,17,19,23,24). U.S. Department of Agriculture (USDA) regulations require that NSLP meals meet the *Dietary Guidelines for Americans* (29) by the school year 1998/99. The Guidelines specify that dietary total fat and saturated fat in school lunches should not exceed 30 percent and 10 percent of total energy, respectively (25). Although USDA regulations do not state specific goals for sodium and dietary cholesterol, it is generally recommended that sodium in school lunches be reduced to approximately 800 mg and cholesterol remain at or below 100 mg, one-third the recommended daily intakes for children (30,31).

The challenge faced by school food services is how best to achieve these nutritional objectives while preserving adequate amounts of energy, protein, vitamins, and minerals in school lunches. The NSLP requires that lunches provide one-third of the Recommended Dietary Allowances (RDA) (15) for energy and selected nutrients: Protein, vitamin A, ascorbic acid, calcium, and iron (25).

Efforts are now underway nationwide, under the leadership of USDA's Team Nutrition, to lower the total fat, saturated fat, and sodium in school meals (26). Other school food service programs have also been developed to assist schools in reducing total fat and sodium in school meals (1,2,8,9,16,22,23,32,33). Although several of these programs proved to be effective in modifying

school meals, results reported were limited to traditional school menus.

Many schools have expanded their menus to include selections from "food bars" in place of, or as part of, the more traditional lunches. Traditional lunches, where food items are portioned and served to the students by cafeteria staff, are in contrast with food bars, which offer a variety of foods from which each student may self-serve food items. Food bars include fruit and vegetable salad bars, Mexican bars (taco and fillings), potato bars (baked potato with a variety of toppings), and deli bars (where students can build their own sandwiches). Whether lunches constructed from such food bars provide less total fat, saturated fat, and sodium than traditional lunches has not been fully investigated due to methodological issues associated with their analysis.

The Child and Adolescent Trial for Cardiovascular Health (CATCH) evaluated both traditional school lunch menus and food bar menus collected in 96 elementary schools (40 control and 56 intervention) across four States (California, Louisiana, Minnesota, Texas) from the fall of 1991 through the spring of 1994. CATCH was a prospective, multicenter study involving school and family-based interventions aimed at reducing cardiovascular risk in a cohort of elementary school children (12).

One component of the CATCH intervention was *Eat Smart*, a food service program designed to lower the total fat, saturated fat, and sodium content of school lunch and breakfast menus in the intervention schools (17,18). Specific *Eat Smart* objectives for school lunch menus as offered were to reduce the average amount of total fat to no more

than 30 percent of energy, saturated fat to no more than 10 percent of energy, and sodium by at least 25 percent from baseline levels to between 600 and 1,000 milligrams (mg). Although these nutritional objectives were applied primarily to the traditional school lunch menus, food bars were also included in modification efforts using specific *Eat Smart* guidelines and fat and sodium criteria for recipes, ingredients, and vendor products. Details of the *Eat Smart* program, food service staff training, intervention materials, and process and outcome evaluations have been described in detail elsewhere (6,14,17-19,21).

The primary purpose of this paper was to examine if food bar-type lunches as offered in the CATCH study provided a healthier alternative to traditional lunches and whether the *Eat Smart* intervention had any effects on the nutrient content of these food bars. A secondary objective was to determine if one type of food bar, a vegetable and fruit salad bar, provided a lower fat and sodium alternative to the traditional vegetable and fruit component of school lunch. Finally, the method for nutrient analysis of food bars is described and methodological issues that arise in such analyses are briefly discussed.

Methodology

A food bar was defined as such if it met all of the following criteria: (1) the menu was identified as a food bar by the school cafeteria manager, (2) students were allowed to choose among the food items offered and serve themselves, and (3) foods were provided in large serving dishes or dispensers (not preportioned), except for more expensive items such as meat, cheese, and milk, which were usually only available in standard, limited quantities.

Food bars were... either “complete” or “partial” based on the extent to which they fulfilled the requirements for a NSLP reimbursable lunch.

Food bars were also categorized as either “complete” or “partial” based on the extent to which they fulfilled the requirements for a NSLP reimbursable lunch (28). Complete food bars consisted of all five meal components (that is, a meat/meat alternate, two vegetable/fruit, a bread/bread alternate, and milk). Partial food bars met only the vegetable/fruit meal component requirement of the meal patterns.

All traditional and food bar menus and recipes were collected over 5 consecutive days during visits to the schools by trained and certified CATCH staff at 3 periods: baseline (fall 1991), interim (fall 1992), and follow-up (spring 1994) (7). Data were sent to the CATCH Coordinating Center at New England Research Institutes, Watertown, MA, for coding and quality control checks. Data entry of the school lunch menus and recipes was performed at the University of Minnesota’s Nutrition Coordinating Center using their Nutrition Data System (NDS), food database version 4A, nutrient database version 19.

It was beyond the scope of the CATCH study to collect observational data for type and amount of food items selected by students from the food bars. Production sheets were not available from all the schools’ food service departments; therefore, data were not available on the total amounts of each food item taken from the food bars during the lunch period.

Given these limitations, one possible approach to the nutrient analysis of food bars is to assume that students are offered only the minimum amounts of each meal component necessary to satisfy the USDA-NSLP meal pattern requirements for a reimbursable meal. However, this approach does not seem realistic given

that some food bar food items that are likely to be chosen by students do not contribute to the USDA-NSLP meal pattern requirement, such as toppings, condiments, and desserts.

Another approach would be to construct a food bar meal with all the items offered on the food bar. However, this approach seems unrealistic given the numerous food items on some food bars. If a student chose a full serving of each item, the lunch meal constructed could provide an unusually excessive amount of calories. Therefore, the assumption was made that students are offered the minimum serving of each meal component to meet the USDA-NSLP requirements plus toppings, condiments, and desserts whenever available.

Food bar information was recorded on a form by the school cafeteria manager and reviewed with him/her by a CATCH-trained food service data collector. Each food bar form listed the complete food-item description, its intended meal component category, recipes, and vendor product information. Most of the foods offered on the food bars were “self-serve” items that the children served themselves from bulk containers and, therefore, had no reported serving size.

For nutrient coding purposes, self-serve food items were assigned standard portion sizes at the CATCH Coordinating Center. Food items that contributed toward fulfilling the meal pattern were assigned portion sizes corresponding to the USDA-NSLP-defined minimum portion sizes for the appropriate meal components. It was necessary to analyze the intended USDA-NSLP lunch that coincided with the grade of the CATCH cohort because CATCH integrated the nutrient values of school menu items with analyses of

Table 1. Nutrient analysis method of food bars: Follow-up salad bar example

Food	Serving size ¹	Source ²	Meal component	Code ³
Lettuce, chopped	3/8 cup	NSLP	Salad bar vegetable	P
Tomatoes, diced	3/8 cup	NSLP	Salad bar vegetable	P
Carrots, shredded	3/8 cup	NSLP	Salad bar vegetable	P
Potato salad	3/8 cup	NSLP	Vegetable	B
American cheese, shredded	2 oz	NSLP	Meat/meat alternate	A
Eggs, hard boiled	1 large	NSLP	Meat/meat alternate	A
Ham, diced	2 oz	NSLP	Meat/meat alternate	A
Croutons	3/4 tbsp	SNDA	Topping	T
Olives, green	3/4 tbsp	SNDA	Topping	T
Bacon bits	3/4 tbsp	SNDA	Topping	T
Ranch dressing	1.5 tbsp	FCEI	Salad dressing	H
Italian dressing	1.8 tbsp	FCEI	Salad dressing	H
White bread	1 slice	SNDA	Bread/bread alternate	E
Pineapple chunks	3/8 cup	NSLP	Fruit	C
Milk, whole	8 fluid oz	School	Milk	F
Milk, 1% lowfat	8 fluid oz	School	Milk	F

$$\text{Average nutrient content of salad bar} = \frac{\bar{A} + \bar{C} + D + E + \bar{F} + 3\bar{T}}{2}$$

where $D = \frac{(\bar{P} + \bar{H}) + \bar{B}}{2}$

¹All food items offered "self-serve" except milk; serving sizes for milk were reported by school cafeteria manager.

²Sources of standard portions assigned to self-serve items:

NSLP = National School Lunch Program Meal Pattern (28)

SNDA = School Nutrition Dietary Assessment Study (4)

FCEI = Foods Commonly Eaten by Individuals (20).

³The alphabetic codes refer to USDA-NSLP meal component or food category listed in previous column.

For food items that did not contribute to the meal pattern, such as salad dressings, sour cream, mustard, and catsup, reference data on amounts children were likely to consume (20) were used. The assigned portion sizes for some of these food bar items also varied by measurement period, reflecting differences in typical amounts consumed by children at different ages. For example, the average quantity of catsup consumed per single eating occasion for children age 6-8 is 1.3 tablespoons, whereas for children age 9-14, it is 1.5 tablespoons (20).

For other non-USDA meal pattern food items and those for which no reference data were available, portion sizes published by the School Nutrition Dietary Assessment (SNDA) Study (4) were used as standards. Table 1 lists some of the serving sizes assumed for self-serve food items at follow-up (5th grade).

Daily menus were "disaggregated" into traditional lunch menus and food bar menus (7). Food items were then categorized and assigned an alphabetic code as follows: Meat/meat alternate (A), nonsalad vegetable (B), fruit (C), bread/bread alternate (E), milk (F), dessert (G), salad dressing (H), salad vegetables (P), and toppings (T). All menus were cross-checked by a CATCH Coordinating Center nutritionist for menu-coding consistency.

24-hour dietary recalls collected from children at baseline and follow-up (13).

The minimum required portion size for some food items increased from baseline (3rd grade) to follow-up (5th grade), so the assigned standard serving sizes increased as well (28). For example, a self-serve serving size of sliced turkey presented on a food bar when the cohort was in 3rd grade was 1.5 ounces, the

USDA-NSLP minimum requirement for meat/meat alternate for grades K to 3 (28). The self-serve serving size for the same food item presented on a food bar when the cohort was in 5th grade was assigned an amount of 2 ounces, the USDA-NSLP minimum requirement for meat/meat alternate in grades 4-12 (28). Fourth grade serving sizes were assigned for food bars collected at interim.

Nutrient analysis of the food bar and traditional lunch menus was completed at the CATCH Coordinating Center. Traditional lunches were analyzed using the method described elsewhere by Osganian and colleagues (19). Briefly, the traditional lunches were constructed using the minimum requirements for the USDA-NSLP meal pattern. The sum of one average serving of each of the meal

Table 2. Number of CATCH schools offering complete or partial food bars by site, treatment group, and measurement period

Site	Treatment group	Measurement period					
		Baseline		Interim		Follow-up	
		Food bar type		Food bar type		Food bar type	
		Complete	Partial	Complete	Partial	Complete	Partial
California	Intervention	0	13	0	14	0	14
	Control	0	10	0	10	0	10
Louisiana	Intervention	1	0	3	0	3	0
	Control	3	0	3	0	5	0
Minnesota	Intervention	2	1	1	1	2	1
	Control	2	0	2	2	2	0
Texas	Intervention	0	0	3	0	2	0
	Control	0	0	0	0	0	0
Overall	Intervention	3	14	7	15	7	15
	Control	5	10	5	12	7	10

components (meat/meat alternate, vegetable/fruit, milk) and up to two average servings of bread/bread alternate, plus one average serving each of condiments and desserts, when offered, was used to define a lunch meal (19).

Nutrients were calculated for each food bar meal in a similar fashion using the method depicted by the formula in table 1. A school lunch menu typically included one to two servings of bread/bread alternates per day since the USDA-NSLP minimum traditional meal pattern specifies eight servings per week for this meal component.

Toppings, which consisted of salad garnishes and potato, taco, and sandwich accompaniments, were analyzed

according to food bar type. Common cultural dietary practices were taken into account when toppings were coded for nutrient analysis.

For potato bars and deli bars, the nutrient contents of all nonmeat toppings or accompaniments were averaged together and a value for one composite topping was used. Meat toppings counted toward the meat/meat alternate requirement. For taco bars, the nutrient content of all toppings was added together, since the underlying assumption was that all the toppings, such as cheese, lettuce, tomato, and sour cream, were intended to be served with a taco. Fruit and vegetable food bars were analyzed with up to three toppings.

The effect of lunch menu type on the average nutrient content of school lunches as offered was investigated using the analysis of variance (ANOVA) technique. The primary analysis compared complete food bars with traditional lunches and was restricted to schools offering both types of lunches. Sixteen schools offered both complete food bars and traditional lunches at least once over the 3 years of study. Of these 16 schools, 8 offered both types of lunch at baseline, while 12 and 14 did so at interim and follow-up, respectively. A total of 34 matched pairs of food bar and traditional lunch data was available for this analysis. Table 2 shows the distribution of schools across study sites, treatment groups, and time.

A secondary analysis investigated whether partial food bars differed nutritionally from the vegetable/fruit component of traditional lunches. California offered the vegetable/fruit component of school lunch as partial food bars over all 3 years, except for one school at baseline that was omitted from the analysis.

Ten of the 24 schools in California also offered a pre-portioned, hot vegetable on at least 1 of the 5 days that menus were collected (average of 1.6 days). This hot vegetable was included in the analysis of partial food bars to represent the complete vegetable/ fruit component as offered in California. Since few schools at the remaining sites offered this meal component as a partial food bar, Louisiana, Minnesota, and Texas schools acted as a comparison group for the vegetable/fruit component served in the traditional manner, for a total of 287 observations.

Nutrients of interest for both sets of analyses included energy, total fat, saturated fat, sodium, cholesterol, carbohydrate, protein, dietary fiber, and vitamins and minerals (specifically vitamin A, ascorbic acid, iron, and calcium). The ANOVA model for the primary analysis comparing traditional lunches with complete food bars included as fixed independent effects: CATCH site (df=2: Louisiana, Minnesota, Texas); time (df=2: baseline, interim, follow-up); lunch type (df=1: traditional, food bar); treatment group (df=1: control, intervention); and all higher order interactions among time, lunch type, and treatment group.

The ANOVA model for the secondary analysis was similar, except that the source of the vegetable/fruit component (partial food bar vs. traditional menu) was

introduced as a fixed effect in place of site. Both models incorporated school as a random effect to account for school-to-school variation.

When analysis of log transformed data was necessary to satisfy modeling assumptions, estimates of means and standard errors were transformed back to their original units for presentation. All mixed models were fit with restricted maximum likelihood estimation using the Statistical Analysis System's Proc Mixed (version 6.08, 1992, SAS Institute, Inc., Cary, NC).

Results

No differences in the mean percentage of energy from total fat or saturated fat, total energy, sodium, or dietary cholesterol were evident between control and intervention schools for either food bar or school-matched traditional lunches at baseline, interim, or follow-up (data not shown). Since no intervention effects were seen in this subsample of lunch menus, the results reported in the following text and table 3 represent the mean nutrient content of food bar and traditional lunches as offered across all sites for all measurement periods and treatment groups combined. The effects of the *Eat Smart* intervention on the lunch menus in all 96 CATCH schools are presented elsewhere (19).

Food bar lunches provided less total food energy than school-matched traditional lunches ($p<0.001$); however, food bars still contributed about one-third of the RDA for children 7-10 years of age (15). Food bar lunches provided a greater percentage of energy from fat ($p<0.001$) and saturated fat ($p<0.001$) than traditional lunches; however, no differences were evident in total fat and saturated fat content.

Food bar lunches provided less total food energy than school-matched traditional lunches.... Food bar lunches provided a greater percentage of energy from fat ($p<0.001$) and saturated fat ($p<0.001$) than traditional lunches...

Food bars provided fewer grams of carbohydrate ($p<0.001$) and protein ($p=0.015$) than traditional lunches. When analyzed as a percentage of the total energy content of the lunches, food bars provided less carbohydrate ($p<0.001$) than traditional lunches, whereas there was no difference for protein.

No differences were noted in the mean sodium or dietary cholesterol content of meals offered when food bar and corresponding traditional lunches were compared. Average sodium exceeded the *Eat Smart* program goal of 600-1,000 mg for both food bars and traditional lunches. Both the food bar and traditional lunches met the nationally recommended dietary cholesterol goal of 100 mg or less per lunch. When examined per 1,000 calories, food bars and traditional lunches did not differ in sodium provided; however, food bars provided more dietary cholesterol than traditional lunches ($p<0.001$).

Table 3 also shows mean nutrient data per 1,000 calories for selected vitamins and minerals in food bar and traditional lunches. The amount of ascorbic acid and calcium per 1,000 calories was greater in food bars than in traditional lunches ($p<0.001$ for both). No differences in vitamin A value, iron, or dietary fiber content were evident. Both food bar and traditional lunches as offered exceeded one-third the RDA (15) for protein, vitamin A, ascorbic acid, calcium, and iron.

Treatment group comparisons for single meal components, such as the vegetable/fruit component, were not the focus of this paper. Therefore, the results reported in table 4 represent a comparison of the mean nutrient content of partial food bar

Table 3. Nutrient profiles of food bar and traditional school lunch menus¹

Nutrient	Menu type	Mean (SE) ²	P value ³
Energy (kcal)	Food bar	641 (16)	<0.001
	Traditional	727 (16)	
Total fat (g)	Food bar	28.7 (1.0)	0.94
	Traditional	28.7 (1.0)	
Total fat (% of energy)	Food bar	40.3 (0.9)	<0.001
	Traditional	35.4 (0.9)	
Saturated fat (g)	Food bar	11.5 (0.5)	0.65
	Traditional	11.2 (0.5)	
Saturated fat (% of energy)	Food bar	16.3 (0.5)	<0.001
	Traditional	14.0 (0.5)	
Carbohydrate (g)	Food bar	68.1 (2.3)	<0.001
	Traditional	86.6 (2.3)	
Carbohydrate (% of energy)	Food bar	42.3 (0.8)	<0.001
	Traditional	47.6 (0.8)	
Protein (g)	Food bar	29.6 (0.8)	0.015
	Traditional	32.4 (0.8)	
Protein (% of energy)	Food bar	18.5 (0.3)	0.13
	Traditional	17.9 (0.3)	
Sodium (mg)	Food bar	1194 (39)	0.29
	Traditional	1250 (39)	
Sodium (mg/1000 kcal)	Food bar	1900 (58)	0.054
	Traditional	1731 (58)	
Cholesterol (mg)	Food bar	95.2 (4.7)	0.059
	Traditional	84.2 (4.7)	
Cholesterol (mg/1000 kcal)	Food bar	149 (5)	<0.001
	Traditional	116 (5)	
Iron (mg/1000 kcal)	Food bar	5.5 (0.1)	0.11
	Traditional	5.8 (0.1)	
Calcium (mg/1000 kcal)	Food bar	800 (26)	<0.001
	Traditional	695 (23)	
Vitamin A value (RE/1000 kcal)	Food bar	505 (28)	0.24
	Traditional	465 (28)	
Ascorbic acid (mg/1000 kcal)	Food bar	45.9 (4.8)	<0.001
	Traditional	31.4 (3.3)	
Dietary fiber (g/1000 kcal)	Food bar	7.5 (0.3)	0.58
	Traditional	7.4 (0.3)	

¹N=68 observations: 34 schools offered both menu types at baseline, interim, or follow-up.

²Adjusted mean (standard error).

³P value from analysis of variance testing the hypothesis that the mean nutrient value for food bars was equal to the mean nutrient value for traditional school lunches.

Table 4. Nutrient profiles of partial food bar and traditional vegetable/fruit components of school lunch¹

Nutrient	Vegetable/ fruit component type	Mean (SE) ²	P value ³
Energy (kcal)	Partial food bar	152 (6)	0.007
	Traditional	133 (3)	
Total fat (g)	Partial food bar	6.5 (0.4)	<0.001
	Traditional	3.8 (0.2)	
Saturated fat (g)	Partial food bar	1.0 (0.1)	0.26
	Traditional	1.2 (0.1)	
Carbohydrate (g)	Partial food bar	23.9 (1.0)	0.060
	Traditional	24.5 (0.6)	
Protein (g)	Partial food bar	2.1 (0.1)	0.32
	Traditional	2.3 (0.1)	
Sodium (mg)	Partial food bar	188 (18)	0.73
	Traditional	196 (11)	
Cholesterol (mg)	Partial food bar	2.5 (0.7)	0.020
	Traditional	4.4 (0.4)	
Iron (mg)	Partial food bar	0.75 (0.05)	0.65
	Traditional	0.77 (0.03)	
Calcium (mg)	Partial food bar	27 (2)	0.044
	Traditional	32 (1)	
Vitamin A value (RE)	Partial food bar	139 (17)	0.92
	Traditional	141 (10)	
Ascorbic acid (mg)	Partial food bar	11.5 (0.6)	<0.001
	Traditional	14.9 (0.5)	
Dietary fiber (g)	Partial food bar	2.9 (0.1)	0.77
	Traditional	3.0 (0.1)	

¹N=287 observations: 71 schools (California) with partial food bars compared with 216 (remaining three sites) with traditional vegetable/fruit components, over all 3 years.

²Adjusted mean (standard error).

³P value from analysis of variance testing the hypothesis that the mean nutrient value of the vegetable/fruit component in partial food bars was equal to that in traditional school lunches.

and traditional vegetable/fruit components for control and intervention schools and all measurement periods combined.

Partial food bars contributed more total fat ($p<0.001$), yet similar amounts of saturated fat, when compared with the traditional vegetable/fruit component. No differences in carbohydrate or protein content were evident.

The sodium content of partial food bars and traditional vegetable/fruit components did not differ. Partial food bars provided less dietary cholesterol than the traditional vegetable/fruit component ($p=0.02$).

The vitamin A value, iron, and dietary fiber content for the two types of vegetable/fruit component, also shown in table 4, did not differ. Partial food bars provided less calcium and ascorbic acid than the traditional vegetable/fruit component ($p=0.044$ and $p<0.001$, respectively).

Discussion

The research methods presented in this paper for analyzing school food bar lunches provide an important contribution to the assessment of school-based intervention programs aimed at modifying fat, sodium, and other nutrient intakes of children. Standardized methodologies for evaluating the nutrient content of food bars have not been available until recently. Now that such methods are available, school food service managers and directors can assess meals as offered and bring them into compliance with USDA regulations (25).

The method developed for use in CATCH and reported in this paper can serve as a model for analyzing food bar meals. This method for representing a complete “lunch” was not necessarily comparable with a lunch that a student would select and is a limitation of this study. Studies that characterize and analyze lunches as actually chosen by students are necessary to lend insight into what children are eating and how what is offered in school lunch influences their choices.

Food bars as analyzed in this study were not as healthful as many school food service directors, parents, and others may perceive them to be. They provided significantly more total fat and saturated fat as a percentage of energy than traditional lunches; however, they also provided significantly less total energy, so the fat content (in grams) did not differ between the two types of lunches as offered.

The difference in carbohydrate content was primarily responsible for the difference in energy levels between the lunches. Total energy provided by food bars may have been skewed due to assumptions made in the coding of individual portion sizes and their effect on the subsequent nutrient analysis of these lunches.

The amount of total carbohydrate observed in food bar lunches may have been lower than in traditional lunches because the food bar items that fulfilled the meat/meat alternate requirement were typically cold cuts, cheeses, cheese sauces, and taco meat, which are low in total carbohydrate. In contrast, traditional lunches often included entree items that not only fulfilled the meat/meat alternate component of the meal but also provided a bread/bread alternate, such as spaghetti with meat sauce,

breaded chicken, corn dogs, and pizza, all of which provide considerable amounts of energy in the form of carbohydrate. Often a second bread/bread alternate, for example, a roll, was served with the traditional lunches, whereas only one bread choice was offered with most food bar lunches.

Also, vegetables served on many of the food bars were those usually found in salads, such as lettuce, tomatoes, cucumbers, peppers, carrots, and celery, which are lower in carbohydrate and energy than the types of vegetables usually served with traditional lunches, such as peas, beans, corn, and potatoes (most often as french fries). Although baked potatoes served in potato bars provided a substantial amount of carbohydrate, these types of food bars accounted for only 20 percent of all food bars analyzed.

When food bars and their school-matched traditional style lunches were examined, we did not find effects of the *Eat Smart* intervention as was found in previous analyses of all 96 CATCH schools (19). It is possible that this was due to the small number of CATCH schools that served food bar meals used in the analysis presented here.

Sodium content did not vary by style of lunch but was higher than the desired range of 600-1,000 mg of sodium in both lunch types. Some high sodium foods offered on CATCH food bars included salad dressing, cold cuts, cheese, taco meat, salted crackers, and bacon bits. Since a major focus of the *Eat Smart* intervention was sodium reduction, a decrease in the sodium content of the lunch menus offered in the intervention schools was expected. However,

increased portion sizes from 3rd to 5th grade (CATCH analysis reflected this trend) may have partially counteracted *Eat Smart* effects on the sodium content of the lunch menus.

One problem is that as companies lower the fat in commercially prepared foods, many of these food items may remain high or may even increase in sodium content to compensate for loss of flavor associated with the removal of fat (13,19). Efforts are now underway by the Federal Government to provide schools with lower sodium commodities to help ensure healthy school meals (27).

The cholesterol content of food bars was higher than that of traditional lunches when examined per 1,000 calories; however, this result seems less important than the finding that both types of lunches met the recommended goal of no more than 100 mg cholesterol per lunch (31).

Both food bars and traditional lunches met the USDA-NSLP requirement (25) of one-third the RDA (15) for selected nutrients; however, some significant differences were noted in the calcium and ascorbic acid densities provided by the two types of lunches. A major contributor of calcium to the school lunch is milk, which was offered in the same quantity and style in both lunch types. Cheese—also a significant source of calcium and often served in both types of lunches—was offered more frequently in the food bar than in the traditional lunch as either a topping for tacos, potatoes, or salads, or to help fulfill the meat/meat alternate requirement, such as in a sandwich on a deli-type food bar.

It is more difficult to explain the higher ascorbic acid content of food bars compared with traditional lunches without further analysis given that major sources of this nutrient, such as oranges, grapefruits, broccoli, cauliflower, green peppers, potatoes, and tomatoes were offered regularly and in similar quantities in both lunch types. The food-based analyses that would be required to provide this type of information were not within the scope of this study.

Dietary fiber content of the food bar was not greater than that of the traditional lunch as might have been expected; rather, the dietary fiber content of the two types of lunches was similar. Vegetable selections offered on food bars such as iceberg lettuce, celery, and cucumbers are not always high in dietary fiber when compared with many of the vegetables served in the traditional lunches, such as peas, beans, and corn. The same fresh fruit and grain products were frequently offered with both types of lunches.

Also, it is possible that the portions of food bar vegetables students choose to eat are greater than the portions assigned in this analysis due to the self-serve nature of food bars. Therefore, the actual food bar lunch as selected and consumed could be higher in dietary fiber content, as well as other nutrients, than these results suggest.

Partial food bars are not necessarily a healthful alternative to the traditional vegetable/fruit component, since they were higher in total fat and provided similar amounts of saturated fat and sodium. All partial food bars in this study offered one or more types of salad dressing, possibly reflected in

the higher total fat content observed in partial food bars when compared with the traditional vegetable/fruit component.

Each partial food bar was analyzed with one composite salad dressing serving and serving sizes ranged from 1 to 2 tablespoons (the equivalent of 5 to 14 g of fat for regular dressings). The traditional vegetable/fruit component some days consisted of a vegetable with added fat, such as butter or bacon; other days it was without added fat. Other sources of fat in the partial food bars included potato salad, coleslaw, trail mix, and in some schools, french fries or other hot vegetables served with butter or margarine.

Applications

Food bars can be a good nutritional alternative to the traditional school lunch but only with careful planning and monitoring of the nutrient content of each food item served and the total amount of food energy provided. Although food bars often contain healthful choices such as fresh fruits and vegetables, they also contain high fat dishes such as pasta or vegetable salads with mayonnaise, cheeses, cold cuts, salad dressings, and dessert items. Using lowfat and fat-free salad dressings, lowfat recipes and vendor products for the meat or meat alternate, and including at least two bread/bread alternates in the menu may help to decrease both the relative and absolute amounts of fat in food bars.

CATCH was conducted in elementary schools where food bars are offered less frequently than in middle and high schools. According to the SNDA study, 16 percent of elementary schools offered a salad bar at least once a week, increasing to 44 percent of middle schools and 54 percent of high schools (3). A study involving secondary schools might yield different results, reflecting larger food portions and/or different food offerings.

This study examined the nutrient content of elementary school food bars as offered. However, the particular food items and the nutrient composition of the meal the students select is an important question that needs investigation. Until additional information is available on the nutrient analysis of food bars, it should not be assumed that these alternatives to the traditional school lunch are the healthier choice. Thus, our data suggest that food service interventions should target food bars as significant contributors of total fat, saturated fat, and sodium in elementary school lunches.

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Households Receiving Food or Meals as Pay

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In today's economy, the noncash benefits of a job are often as important as wages or salary. Health care insurance, child care support, and transportation subsidies are examples of major noncash benefits. These benefits may be substantial, especially as they are not subject to taxation.¹ A minor but interesting benefit is food or meals. To supplement current findings on noncash benefits of employment, this short paper was undertaken to examine households reporting the receipt of food or meals as pay.

Data

Data used are from the Diary portion of the 1993-94 Consumer Expenditure Survey (CE), conducted by the Bureau of the Census for the Bureau of Labor Statistics. The CE is an ongoing survey that collects data on food and other selected expenditures, income, and major sociodemographic characteristics of consumer units (for this study, the term "consumer unit" will be used interchangeably with household). A national sample of consumer units, representing the civilian noninstitutionalized population, is selected and asked to keep expenditure diaries, which cover each of two consecutive 1-week periods. The diaries are placed throughout the year with oversampling done during the

fourth quarter of the year. Each week is deemed an independent sample by BLS. The 1993-94 Diary survey contains information from approximately 22,000 diaries.

Although the terms "households" and "consumer units" will be used interchangeably, there is a slight difference. A consumer unit is defined by blood relationship, marriage, or adoption; financial interdependence; and joint expenditures. In contrast, a household is defined by residence in a housing unit. It is possible for two or more consumer units to reside in a household. For example, two individuals may live together but be financially independent and make separate expenditures; this would be categorized as two single consumer units residing in the same household. A small percentage (7 percent) of consumer units receiving meals as pay resided in a multiunit household. Some of these people may be employed by the other consumer unit in the household and may receive meals as pay from this other unit. Child care providers who live with the family for whom they provide child care would be included in this category.

The value of meals received as pay is expressed as the average weekly dollar value during the past year. It was derived from the CE questions: "During the past 12 months, have any members of your consumer unit received any free

¹For an overview of these benefits, see *Employee-Benefits in a Changing Economy: A BLS Chartbook*, Bulletin 2394, September 1992.

meals at work as part of their pay?”, “About what was the weekly dollar value of such meals?”, and “How many weeks did members of your consumer unit receive such meals during the past 12 months?” Value was readily assigned for meals with a price attached to them; value for meals provided without a price attached to them needed to be estimated by the recipient. The value of these meals may be underestimated or overestimated—it is impossible to assess the extent of this with the data.

Households that were complete income reporters were selected for analysis. Complete income reporters are households that provide values for major sources of income, such as wages and salary, interest/dividends, and Social Security; however, complete income reporters do not necessarily provide a full accounting of their income. The unweighted sample of complete income reporters consisted of 17,404 households; of these, 675 reported receiving meals as pay. Data were weighted to represent the population.

In order to place households that received meals as pay in perspective, those households that did not were also analyzed. Tests of statistical significance (chi-square and t-tests) were performed between the two groups using unweighted data and reported at the 0.01 level. The 0.01 level of statistical significance was selected rather than the more traditional 0.05 level to compensate for any possible clustering effect present in the data. All percentages and means reported, however, are based on weighted data.

Results

Four percent of all households (2.96 million consumer units that were complete income reporters) reported having members who received meals as pay. There

Characteristics of households receiving and not receiving meals as pay, 1993-94

Characteristics	Receiving meals as pay	Not receiving meals as pay
<i>Mean</i>		
Age of head ¹ *	36	48
Household size	2.5	2.5
Before-tax income	\$32,300	\$34,300
<i>Percent</i>		
Family type		
Husband-wife only	15	21
Husband-wife with children	31	28
Single-parent with children	8	6
Single	31	29
Other ²	15	16
Race		
White	88	87
Non-White	12	13
Education of head*		
No high school diploma	13	21
High school diploma	29	30
Some college	31	25
College degree	27	24
Occupation of head*		
Service	22	8
Managerial/professional	31	22
Other ³	47	70
Food stamp receipt		
Yes	7	7
No	93	93
Region		
Urban ⁴	86	85
Rural	14	15

*Differences between the two groups were statistically significant at $p \leq 0.01$ based on unweighted data.

¹The household head is defined as the person who owns or rents the home; in cases where there is joint ownership or renting status, the head is arbitrarily decided so is actually a co-head.

²Includes husband-wife or single-parent households residing with others.

³Other includes administrative support, technical, and sales; operators, assemblers, and laborers; precision production, craft, and repairs; farming, forestry, and fishing; Armed Forces; self-employed; and not working.

⁴Urban areas are defined as Metropolitan Statistical Areas (MSA's) and places outside an MSA of 2,500 or more people; rural areas are places of fewer than 2,500 people outside an MSA.

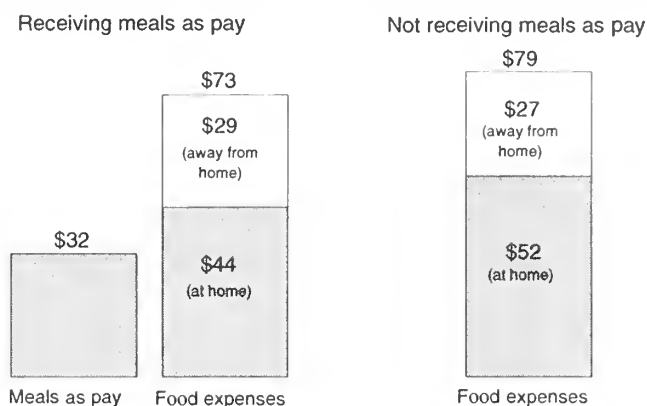
were significant differences between households receiving meals as pay and those that did not, by household head's age, education, and occupation.² It should be noted that the head of household was not necessarily the person in the household receiving meals as pay. The CE question of receiving meals as pay is a household level question that could be answered affirmatively if any one in the household was receiving meals as pay.

Among households receiving meals as pay, the household heads were younger than those in households not receiving meals as pay (36 vs. 48 years) (see table). Heads in households receiving meals as pay also had a higher level of education than heads in households not receiving meals as pay. Fifty-eight percent of heads in households receiving meals as pay had at least some college education, compared with 49 percent of heads in households not receiving meals as pay.

Heads in households receiving meals as pay were more likely to be employed in service occupations and managerial/professional occupations (22 and 31 percent) than heads in households not receiving meals as pay (8 and 22 percent). Restaurant employees may account for the greater percentage in service occupations. People with expense accounts may explain the higher percentage being employed in managerial/professional occupations. Receiving meals as pay in managerial/professional occupations is also related to the higher educational level of these household heads, compared with their counterparts in households not receiving meals as pay.

²The household head is defined as the person who owns or rents the home; in cases where there is joint ownership or renting status, the head is arbitrarily decided so is actually a co-head.

Average weekly dollar value of meals received as pay and average weekly food expenses of households, by receipt as pay, 1993-94



Because heads in households receiving meals as pay were in both high-paying (managerial/professional) and low-paying (service) occupations, household average before-tax income (which does not include the value of meals received as pay) was not significantly different in these households from those not receiving meals as pay. There were no significant differences between households receiving and not receiving meals as pay in terms of family type, race, size, region of residence, and food stamp receipt.

For households receiving meals as pay, the average weekly dollar value of these meals was \$32 (see figure). The distribution of this weekly dollar value was skewed; for 62 percent of households, the average weekly dollar value of meals received as pay was \$20 or under and for 7 percent of households, the value was over \$90.

The average weekly food expenditures of households receiving meals as pay was \$73, compared with \$79 for households not receiving meals as pay (a non-significant difference). There was no significant difference between the two

groups in terms of average expenses for food at home and food away from home. This is surprising as one would expect meals received as pay to lower the food expenditures of households.

When the value of meals received as pay was added to the food expenditures of households, households receiving such meals had significantly higher average food expenses than households that did not receive such meals (\$105 vs. \$79).

Meals received as pay represent a substantial noncash benefit for households that receive them, the value being approximately \$1,660 on an annual average basis. When the value of these meals is added to before-tax income, the income of households receiving meals as pay is within a few hundred dollars of the income of households not receiving such meals. It may be that this in-kind benefit is considered part of total compensation, so that cash income is adjusted for the value of in-kind meals and food. Although the impact of these meals on job selection is unknown, as with other noncash benefits, they may be influential.

Food Preparers: Their Food Budgeting, Cost-Cutting, and Meal Planning Practices

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Decisions about household budgets can influence the economic well-being as well as health status of families. A decision to constrain the food budget without adequate consideration of its impact on dietary status may be counter-productive by leading to higher expenditures in other areas, such as short- and long-term nutrition-related medical costs. A recent report indicates that 4 of the 10 leading causes of deaths in the United States are diet related—heart disease, cancer, strokes, and diabetes. Other diet-related conditions are overweight, hypertension, and osteoporosis. Health costs associated with these seven diet-related conditions are approximately \$250 billion each year (1). Thus, household practices related to nutrition status may be of concern for those interested in identifying ways to reduce public and private health costs for American consumers.

Limited household income can constrain the food budget and influence food choices and meal planning decisions. A U.S. Department of Agriculture report shows that households with limited financial resources spend less per person for most food categories and consume less than does the general population (2). Although low-income households spend less on food—in absolute terms—than other households, they spend a

higher percentage of their total income for food. Food preparers in these households have many difficult choices to make in order to provide nutritious meals for family members.

This study focuses on one household practice that may influence the nutritional status of American consumers. It examines primary food preparers who agreed or disagreed with the following item: *I run my household on a strict food budget*. Specifically, it examines the relationship of that reported budgetary decision with: (1) other measures food preparers frequently use to try to cut food costs, (2) their nutritional concerns for the family, and (3) meal planning considerations and practices. Results suggest inconsistencies or limitations in applying commonly recommended cost-saving consumer techniques.

Data Source and Sample

For this study, consumer data from Market Research Corporation of America (MRCA) Information Services are used. This data set is used to link individuals' nutritional attitudes, food consumption patterns, and nutrient intake. MRCA conducts a continuous sampling program using a multistage stratified random design to identify participants for its National Consumer Panel. About 5,000

households are selected based on demographic criteria¹ matched to the U.S. Census. This study uses the Household Information Form that reports individual, household, and geographic characteristics and the Psychographic Questionnaire that reports food selection and preparation practices of the primary food preparer. The sample consists of 5,551 primary food preparers who participated in the 1993-94 and 1994-95 panels. Percentages are weighted to represent the population of interest. Unweighted data are used for Pearson's chi-square significance testing of independence between household budget practices and cost-cutting and meal planning practices.

Results

Sociodemographic Characteristics

More than half of all food preparers reported using strict food budgets (see table). Compared with food preparers who did not adhere to strict food budgets, those who did were significantly more likely to have less education and household income and more people in their household. Two-thirds of those who used strict food budgets had less than a college education, three-fourths had household income less than \$40,000, and almost three-fourths had three or more people in the household. Gender and race were not significantly different between those who used and did not use strict food budgets.

Cost-Cutting Practices

Compared with food preparers who did not follow a strict food budget, those who did were significantly *less* likely to use four different means to cut food expenditures (fig. 1): Make a complete list before shopping (20 vs. 32 percent),

¹The demographic factors are census regions, metro-area size, household size, homemaker's age, and household income.

Food preparers' characteristics, by type of food budget, 1993-95

Characteristics	Type of food budget		
	Overall	Nonstrict	Strict
Sample size	5,551	2,661	2,890
	<i>Percent</i>		
Gender			
Male	46	46	46
Female	54	54	54
Race			
White	88	88	88
Non-White	12	12	12
Education*			
Less than high school	36	32	39
High school	26	25	27
College	38	43	34
Household income ¹ *			
<\$20,000	27	22	31
\$20,000 - \$39,000	41	36	44
\$40,000 and over	32	42	25
Household size*			
One	10	11	9
Two	23	30	19
Three and over	67	59	72

*Difference between food preparers adhering to a strict food budget and other food preparers was statistically significant at $p \leq 0.01$ based on unweighted data.

¹Income is rounded to the nearest thousand in the data set.

stock up when their brands were on sale (5 vs. 9 percent), comparison shop (14 vs. 25 percent), and redeem coupons (10 vs. 14 percent).

Why would those on reportedly strict food budgets not take advantage of different means of cutting food costs? A complete shopping list includes categories such as produce, canned goods, dairy products, meats, and household supplies. Having a strict food budget may compel consumers to limit their purchases to required items. However, it is quite possible that these items are

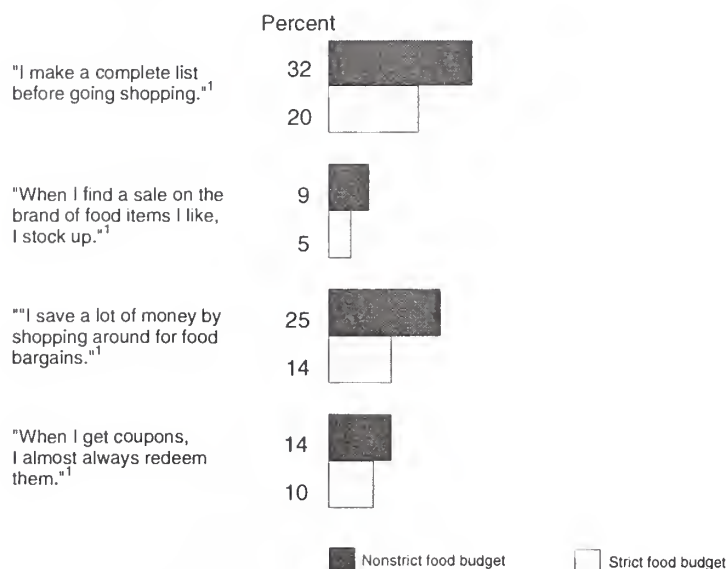
so similar on each shopping occasion that little variation is permitted—thus, there is no need for a list. Stocking up on sale items and comparison shopping among food stores produce immediate costs for the consumer (e.g., out-of-pocket expenditures for sale items and for public or private transportation). Thus, the household on a reportedly strict food budget may be more concerned about current cost than about long-term savings. Coupons, which are generally found in newspapers, magazines, and retail flyers, may not be available to some families.

Nutrition Concerns and Meal Planning Practices

Food preparers who reported using a strict household food budget were significantly more likely than others to be concerned whether the meals they served were nutritious, to believe they made every effort to ensure that family members ate nutritious foods, and to believe they prepared each meal to be nutritionally balanced (fig. 2). There was no significant difference between those with and without a strict food budget regarding their belief that giving the family a wide variety of foods would result in proper nutrition. Also, groups did not differ significantly on the practice of serving their family nutritionally incomplete meals "once in a while."

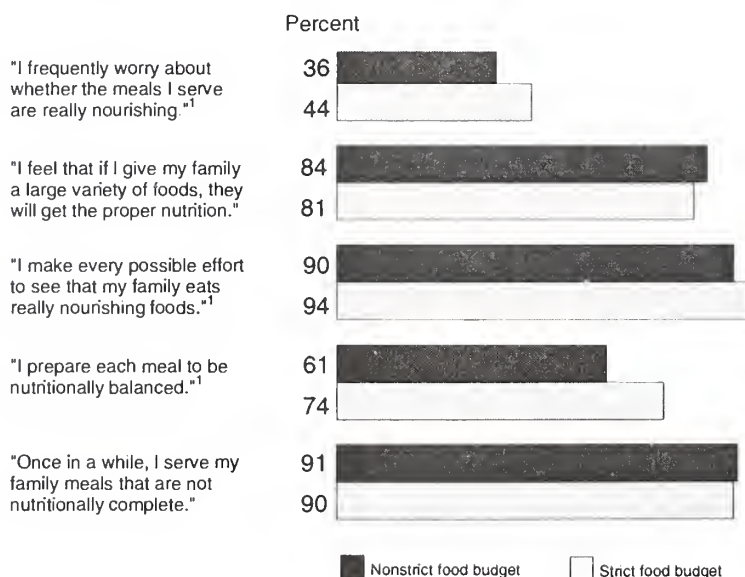
Most households that adhere to strict food budgets do so in order to ensure that their money income goes further in covering all their expenses. To determine whether income level affected differences between those on and not on strict food budgets, further analysis was undertaken on the three significant variables: Worrying if meals were nutritious, making every possible effort to see that the family eats nourishing food, and preparing each meal to be nutritionally balanced. Findings showed that only one variable (worrying if the meals were nutritious) at one income level (\$40,000 and more) failed to indicate significant differences between those on strict food budgets and others (fig. 3). Possibly, at this income level, a "strict food budget" takes on a less literal meaning, and worrying about nutritious meals concerns being well informed and pleasing family members and is not budget-related.

Figure 1. Food preparers' cost reduction practices, by type of food budget, 1993-95



¹Difference between food preparers adhering to a strict food budget and other food preparers was statistically significant at $p \leq 0.01$ based on unweighted data.

Figure 2. Food preparers' nutrition concerns and meal planning practices, by type of food budget, 1993-95



¹Difference between food preparers adhering to a strict food budget and other food preparers was statistically significant at $p \leq 0.01$ based on unweighted data.

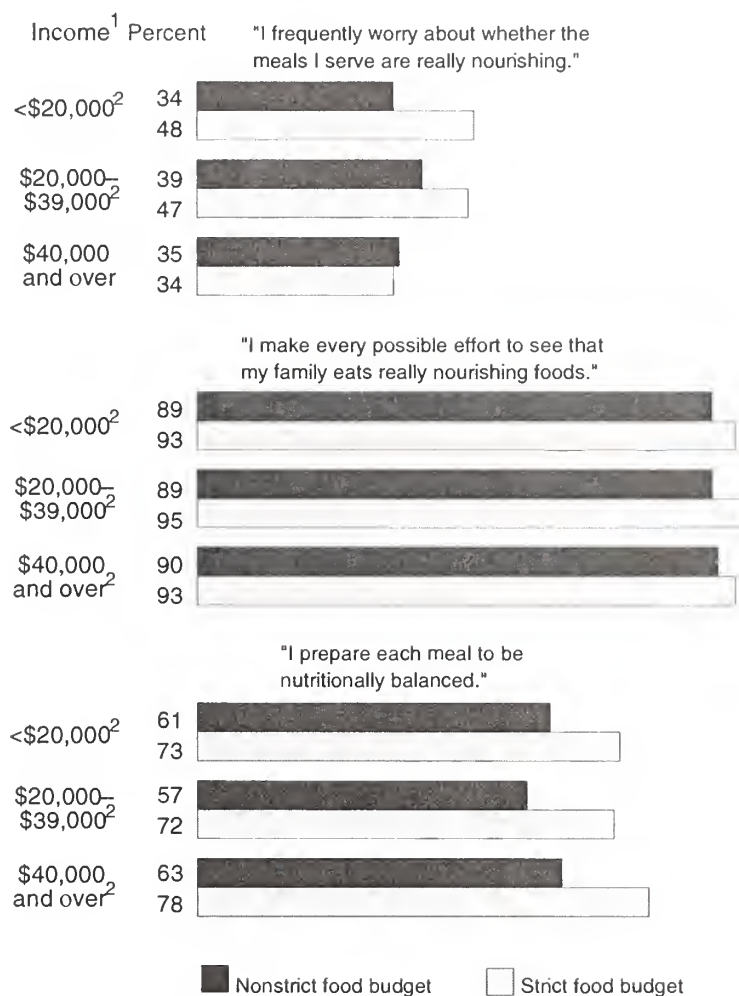
Conclusions and Implications

Food preparers may use a variety of means to cut food costs yet, at the same time, remain concerned about meeting their family's nutritional needs. Findings in this study show that those who are following a strict budget are not willing to sacrifice nutrition. Therefore, they should be receptive to nutrition promotion strategies that focus on economical ways of providing their households with a healthful diet.

Findings also indicate that several of the most commonly recommended planning and budgeting tools for food shoppers are not widely used by those who report being on a strict food budget. It may be that families on a strict food budget cannot spare the money to "stock up" during sales or the time and/or transportation to comparison shop among neighborhood food stores for bargains. However, the strict food budgeters may employ other food shopping strategies not identified in this study.

Additional behavioral research is needed to determine which factors influence consumers' use of various cost-cutting methods. Formative research, such as focus group interviews, may be helpful in identifying food shopping practices and attitudes toward common budgeting recommendations among low-income food preparers. This information could then be used by programs for low-income consumers on household budgeting and/or dietary improvement, such as the USDA Expanded Food and Nutrition Education Program.

Figure 3. Food preparers' nutrition concerns and meal planning practices, by type of budget and income, 1993-95



¹Income is rounded to the nearest thousand in the data set.

²Statistically significant at $p \leq 0.01$ based on unweighted data.

References

1. Frazao, E. 1995. *The American Diet: Health and Economic Consequences*. U.S. Department of Agriculture, Economic Research Service. Agriculture Information Bulletin No. 711.
2. Lutz, S.M., Smallwood, D.M., and Blaylock, J.R. 1995. Limited financial resources constrain food choices. *FoodReview* 18(1):13-17.

The State of Nutrition Education in USDA

On November 15, 1996, an intra-departmental working group of representatives from USDA agencies with a mission area related to nutrition education submitted its report to Secretary Glickman. *The State of Nutrition Education in USDA—A Report to the Secretary* was the culmination of a yearlong effort facilitated by the Center for Nutrition Policy and Promotion (CNPP). The working group assessed the successes as well as weaknesses of USDA's nutrition education efforts, reviewed characteristics of effective contemporary delivery methods, and analyzed trends in programs, legislative history, and funding. The recommendations provide a useful prelude to strategic planning for the 21st century.

A Renewed Vision for Nutrition Education

USDA has long been committed to improving the nutritional health of Americans through a program of research and education to maintain a food supply of high nutritional quality and to encourage consumption of a healthful diet (fig. 1). In the summer of 1995, USDA reconfirmed nutrition as the link between agriculture and health and espoused a renewed vision for nutrition education that would ensure the Department's leadership role in Federal nutrition education into the 21st century. This new vision challenged USDA to revitalize its nutrition education plan and to establish priorities for future nutrition education efforts.

With the 10-year tenure for USDA's 1986 Comprehensive Plan for a National Food and Human Nutrition Research and Education Program about to expire, the impetus for an assessment of the current state of nutrition education in USDA was created. There were other influential facts that were critical to USDA's decision to take action.

Scientific evidence increasingly suggests that poor diet plays an important role in the onset of chronic diseases and other health conditions; in many cases, medical costs and lost productivity might be avoided by an improved diet. Research indicates that nutrition education can help improve diets when behavioral change is set as a goal and when educational strategies are designed to include behavioral change. Motivating people to change their behavior is seen as the key because nutrition education that merely emphasizes dissemination of information and teaching of skills is seldom sufficient to change dietary behavior. Also, substantial changes have occurred in communications, technology, and consumer demographics, lifestyles, and health status. Finally, advances in nutrition science and food technology require updating both delivery and content of nutrition education to reach the public effectively.

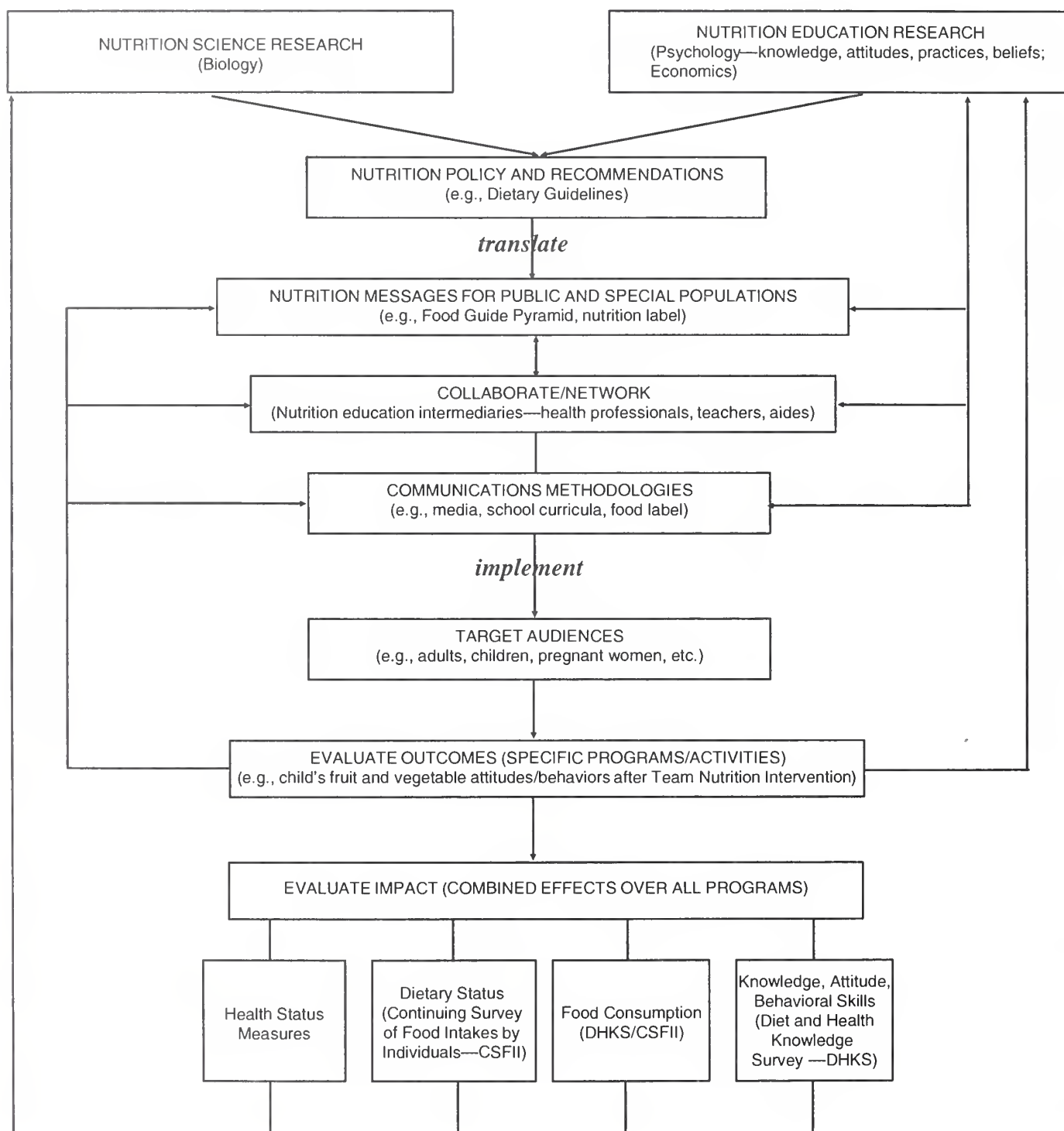
Background Information

The Working Group developed and adopted a framework for describing USDA's contributions to the nutrition education process (fig. 2). Additional information was compiled on the history of nutrition education activities at USDA, key legislation authorizing USDA to conduct nutrition education, data on USDA's annual nutrition education expenditures, and information on some current nutrition education program activities at the Federal, State, and

Figure 1. Major milestones in nutrition education at USDA

1860	'62	USDA formed
1870		
1880		
1890	'90	W.O. Atwater—Human nutrition research
1900	'02	Atwater—Variety, Balance, and Moderation
1910	'14	Cooperative Extension Service
	'16	Caroline Hunt—First food guide
1920		
1930		
	'33	Food Plans at 4 Cost Levels
1940	'41	National Nutrition Conference for Defense
	'46	School Lunch Program began
1950		
	'56	Basic Four Food Guide
1960		
	'64	Food Stamp Program began
	'69	White House Conference on Food, Nutrition and Health
1970	'70	Expanded Food and Nutrition Education Program began
	'71	Food and Nutrition Information Center formed at the National Agricultural Library
	'75	Special Supplemental Nutrition Program for Women, Infants, and Children began
	'77	Food and Agriculture Act of 1977, Nutrition Education and Training Program began; USDA named "lead agency" for nutrition research, extension, and teaching
1980	'80	Dietary Guidelines for Americans first issued
	'82	Joint Subcommittee on Human Nutrition Research defines "nutrition education research"
	'86	USDA Comprehensive Plan for Human Nutrition Research and Education
1990	'90	National Nutrition Monitoring and Related Research Act
	'90	Nutrition Labeling and Education Act/National Exchange for Food Labeling Education
	'92	Food Guide Pyramid
	'94	Nutrition and Food Safety Education Task Force
	'95	Dietary Guidelines for Americans, 4th edition

Figure 2. Interrelationships in USDA Nutrition Education Activities

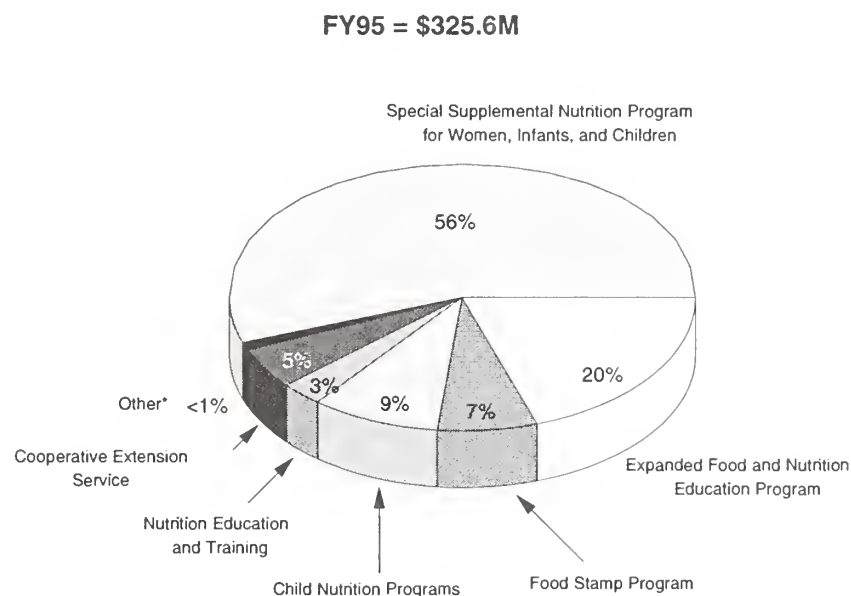


community levels. A special effort was made to identify USDA-sponsored nutrition education activities that had evaluations. All of this information was synthesized into four major findings and 14 recommendations for the Secretary of Agriculture, as follows:

Major Findings

- There are numerous innovative nutrition education activities going on at USDA; timely access to information about them is a challenge. USDA agencies conduct a wide range of activities that contribute to the total nutrition education effort but collecting and sharing information about them is a challenge. Better communication channels would promote information technology transfer.
- Evaluating effectiveness of USDA's current nutrition education efforts is difficult. A combination of factors—paucity of data, inadequate funding, and change in expected evaluation outcomes—has created a challenging environment for USDA to assess the overall effectiveness of its nutrition education activities. Activities that do have an evaluation component indicate varying degrees of effectiveness.
- USDA does not have a consistent mandate to conduct nutrition education throughout all its food assistance programs. In 1862, USDA began with a broad authority to conduct nutrition education. Over time through legislation, that authority has become focused largely on three programs: Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Nutrition Education and Training program (NET); and Expanded Food and Nutrition Education Program (EFNEP).

Figure 3. USDA nutrition education funding



83% of expenditures are for low-income audiences served by WIC, EFNEP, and FSP.
 *Other expenditures by FSIS, FNIC, and CNPP = <1%.

Just recently, policy concerning the delivery of nutrition education within the Food Stamp Program (FSP) has been developed by the Food and Consumer Service (FCS). All of USDA's food programs could benefit from the sustainability that a Department-wide, rather than program-specific, policy on nutrition delivery would provide.

- Many USDA nutrition education efforts have failed to expand due to static Federal appropriations and inflation. The Department's earliest legislation directed nutrition efforts to all Americans. In 1995, however, approximately 83 percent of USDA's nutrition education expenditures (which totaled \$325.6 million) were spent on programs that targeted low-income audiences,

another 12 percent targeted children (Child Nutrition Programs (CNP) and NET) and about 5 percent to the "general public" (fig. 3). In the same year, 79 percent of expenditures went to the three programs with legislated nutrition education responsibilities (WIC, EFNEP, and NET) (fig. 3).

Also, over the past 15 years, funding trends have compromised some nutrition education efforts and reduced the numbers of people receiving nutrition education due to undependable appropriations and inflation. Alternative funding structures and mechanisms would make better use of existing program funds and revive USDA's broad authority to provide nutrition education for all Americans.

Recommendations

Recent trends in the Department's nutrition education efforts indicate a responsiveness to current social and environmental change. Further progress toward achieving a cost-effective, integrated, comprehensive, and sustainable nutrition education program for all Americans by the 21st century requires the Department, along with its State and local partners, to RENEW, RETOOL, and REFUEL nutrition education. USDA needs to:

RENEW by reviving what has worked in the past and building on those successes while adapting to the current environment. Getting input from regional, State, and local partners is critical to the sustainability and success of such a plan.

- *Make Nutrition Education a Priority.* It should be a sustainable, comprehensive, coordinated, and cross-cutting element of the Department's overall strategic plan.
- *Reach Out to All Americans.* Develop and target consistent, science-based messages to all Americans, regardless of program affiliation.
- *Put Nutrition Education Into All USDA Food Programs.* All of USDA's food programs could benefit from a Department-wide, rather than program-specific, policy to deliver nutrition education.
- *Link With Constituencies.* Foster cooperative efforts among the Department's State and local level program constituencies—schools, health and welfare departments, and Cooperative Extension offices.

- *Nurture Partnerships and Coalitions.* Establish and foster nutrition education and promotion efforts with collaborators outside the Department and Federal Government.

RETOOL by focusing on behavior change, accountability, and evaluation.

- *State Nutrition Behavior Change as a Departmental Objective.* USDA's future nutrition education interventions would be evaluated using behavior change as the standard.
- *Evaluate All Nutrition Education Projects.* A commitment to conduct evaluations now will ensure there are data available for future use.
- *Refocus Training.* Provide technical assistance and training opportunities to upgrade the nutrition education and evaluation skills of nutrition professionals at State and local agencies working in USDA programs.
- *Refocus Research.* Increase research in the behavioral and social sciences on cost-effective designs and validated instruments, on evaluation methodologies, and on innovative information transfer technologies.

REFUEL by restoring energy, excitement, and commitment to nutrition education at the Federal, State, and community levels through effective communication channels and increased support of cross-program efforts.

- *Make Information on USDA's Nutrition Education Activities Electronically Accessible.* Establish a Departmental data base that contains summary information on all planned, current, and recent activities at the Federal, State, and local levels.

- *Follow-up With Project-End Reports.* Require those involved with any nutrition education activity sponsored with USDA funds to submit a report on its effectiveness to USDA's National Agricultural Library. These reports can provide direction for future efforts.
- *Publish and Share Project Information.* Publish in professional and academic journals to broaden access to USDA's nutrition education activities at the agency, State, and local levels.
- *Sponsor Cross-Program Meetings.* Develop this two-way communication tool to share program effectiveness and ideas for delivery strategies and cooperative efforts.
- *Explore Alternative Financing.* Look for ways to augment and stretch available Federal dollars to fund and implement cross-program nutrition education efforts.

Source: State of Nutrition Education in USDA Working Group, 1996, *The State of Nutrition Education in USDA—A Report to the Secretary*.

Size and Growth of the Nutritionally Improved Foods Market

Evidence about the role of diet in long-term health is increasing. Many American consumers are interested in nutrition, reading nutrition labels, and changing the types of foods they purchase based on label information. Changing dietary behavior is challenging both for the individual and for nutrition educators as they focus on helping consumers improve their diets. Thus, health officials and consumers alike look to the food industry, with its capacity to manipulate the nutrient content of foods, to play a major role in helping consumers improve their diets.

Since little is known about the market for nutritionally improved foods and their prices compared with traditional foods, this study was undertaken, using supermarket scanner data for 1989-93. Prices, market size, and growth of sales for nutritionally improved foods and their traditional counterparts, were analyzed for 3,000 supermarkets with at least \$2 million in annual sales. Nonscannable items, fresh produce and fresh meat, items sold in bulk, or items prepared or packaged at the store (such as deli and bakery items) were not included.

A total of 37 food categories was considered. Individual products within the 37 food categories were classified as nutritionally improved if they offered at least one nutritional improvement over the traditional food. For some items, nutritional improvement was based on a

Descriptive Terms for Nutritionally Improved Foods

Nutritionally improved foods have various descriptive terms that are included on the product's label. The following is a listing of some of these words and phrases used for nutritionally improved products. Although the list is not exhaustive, it does include the most commonly occurring words and phrases used for nutritionally improved foods.

Examples of Nutritionally Improved Foods

Light	Low/No Cholesterol	Reduced Calorie
Lite	Low/No Fat	Reduced Fat
Poultry-based	Low/No Sodium/Salt	Reduced Cholesterol
High Fiber	Low Calorie	2-percent Fat
Nonfat	Low/No Sugar	Whole Grain
Water-pack	Fat Free	Vegetarian
Juice-pack	Unsweetened	Diet
Sorbet	Frozen Yogurt	Sherbet
Ice Milk	Canola oils	Olive oil
Unsalted	Calcium-Vitamin Fortified	

Brand Names: *Healthy Choice, Featherweight, Lean Cuisine, Weight Watchers*

nutrition-related characteristic from the product label such as "light," "low fat," or "packed in water." Other items, such as canola and olive oils, offer a nutritional advantage because of their desirable lower levels of saturated fats and higher levels of monounsaturated fats, compared with other types of oils.

However, some foods were omitted from the analysis because they did not have a nutritionally improved product or for other reasons. For example, peanut butter did not have a reduced fat version for the entire specified time-frame (1989-93). Dry pudding, gelatin, and drink mixes were excluded because of major differences in weights between the traditional (sugar-sweetened) and sugar-free products, complicating the study analysis.

Nutritionally improved versions of food included but were not limited to: Poultry-based hot dogs and luncheon meats (meat group), frozen yogurt, ice milk, and sherbet (dairy group), and margarine-like spreads containing less than 80 percent fat by weight (fat group). Problems with the definition of nutritionally improved foods occurred with products such as microwave popcorn. In this case, some nutritionally improved products provided a better nutrient profile than others. For instance, low sodium microwave popcorn provides some nutritional improvement over a traditional version, but not as much as a low fat, low sodium product.

In 30 of the 37 food categories, volume sales of nutritionally improved foods increased in either an expanding or shrinking market. For example, from 1989 to 1993 baked goods had an overall increase in sales of 3 percent. In contrast, nutritionally improved baked goods sales rose 31 percent. Also, whereas overall bacon sales declined 5 percent during the same timeframe, nutritionally improved bacon sales increased 59 percent.

In 27 categories, the nutritionally improved versions showed increased volume sales in an expanding market. Twelve categories had increases in traditional versions as well, suggesting that new customers may be trying out the improved foods. However, in the 15 other categories, a decline in volume sales of traditional version foods occurred, suggesting a switch from the traditional version to nutritionally improved foods (table 1).

The remaining three categories showed a growth in "nutritionally improved" products, but did so in a shrinking market, due to a decrease in consumer demand. In addition to bacon, vegetable juice, and butter and margarine, total sales decreased while sales of the "nutritionally improved" versions in the same categories increased.

Volume sales of nutritionally improved foods decreased in 7 of the 37 food categories studied. In all cases except frozen pizza, overall sales within the group declined as well. The frozen pizza category showed an overall increase in sales, while the nutritionally improved product sales decreased.

In 1989-93, the largest percent growth in sales growth of nutritionally improved versions occurred in the following food categories: Refrigerated dairy puddings,

Table 1. Trends in volume sales of 37 food categories

Food categories with increasing volume sales of nutritionally improved and regular versions, and increasing volume sales for the category as a whole:

Bread and baked goods	Spaghetti sauce
Frozen dairy desserts	Pasta/rice dinner mix
Ready-to-eat cereal	Salty snacks
Frozen waffles, etc.	Carbonated beverages
Fruit juices/ades	Frozen entrees
Frozen potatoes	Canned vegetables

Food categories with increasing volume sales of nutritionally improved versions, declining volume sales of regular versions, and increasing volume sales for the category as a whole:

Cheese	Cream cheese
Salad dressings	Hot dogs
Luncheon meats	Whipping creams, etc.
Milk	Dairy puddings
Beer	Popcorn
Cookies	Sour cream
Frozen fruit	Salad/cooking oils
Yogurt	

Food categories with increasing volume sales of nutritionally improved versions, declining volume sales of regular versions, and declining volume sales for the category as a whole:

Bacon
Vegetable juice
Butter and margarine

Food categories with declining volume sales of nutritionally improved versions, increasing volume sales of regular versions, and increasing volume sales for the category as a whole:

Frozen pizza

Food categories with declining volume sales of nutritionally improved and regular versions, and declining volume sales for the category as a whole:

Cottage cheese	Canned pasta
Mayonnaise	Canned fruit
Crackers	Canned tuna

Source: Frazao, E. and Allshouse, J.E., 1996, Size and Growth of the Nutritionally Improved Foods Market, U.S. Department of Agriculture, Economic Research Service, Agriculture Information Bulletin No. 723.

Table 2. Dollar and volume sales for selected nutritionally improved food groups

Food group	Volume sales Million pounds or quarts			Dollar sales Million dollars		
	1989	1993	Direction of change	1989	1993	Direction of change
Frozen entrees	211	250	(+)	800	794	(-)
Canned vegetables	229	248	(+)	147	146	(-)
Canned fruit	608	586	(-)	463	466	(+)
Cottage cheese	273	257	(-)	319	358	(+)
Mayonnaise	489	449	(-)	458	481	(+)
Crackers	188	164	(-)	352	354	(+)

Source: Frazao, E. and Allshouse, J.E., 1996, *Size and Growth of the Nutritionally Improved Foods Market*, U.S. Department of Agriculture, Economic Research Service, Agriculture Information Bulletin No. 723.

shelf-stable spaghetti and marinara sauces, cookies, whipped topping, microwavable popcorn, cream cheese, and sour cream.

Trends in dollar sales can be very different from trends in volume sales because prices and volume sales may move in opposite directions. Nutritionally improved versions in six food categories (frozen entrees, canned vegetables, canned fruit, cottage cheese, mayonnaise, and crackers) had dollar sales and volume sales that moved in opposite directions. From 1989-93, prices for frozen entrees and canned vegetables decreased slightly, resulting in lower dollar sales for these categories, even though volume sales increased for both categories. The opposite was true for nutritionally improved foods in canned fruit, cottage cheese, mayonnaise, and crackers. In these categories, volume sales decreased from 1989-93, but higher prices resulted in higher dollar sales (table 2).

Dollar sales and volume sales may also move in the same direction. In three food categories (canned tuna, frozen pizza, and canned pasta), dollar sales

and volume sales both decreased. However, despite a higher price, consumers are sometimes willing to pay for a more desirable (nutritionally improved) product. Thus, dollar sales and volume sales both increase. This occurred in 28 food categories.

In 1993, nutritionally improved foods in 30 categories were higher priced than their traditional counterparts. The price differences ranged from \$0.03 to \$1.86 per pound, reflecting a 2 to 94 percent higher price than the traditional versions. Six food categories (beer, crackers, hot dogs, milk, frozen potatoes, and canned vegetables) had nutritionally improved versions priced 3 to 15 percent lower than their traditional versions. For the most part, it is not clear why these nutritionally improved products cost less than their traditional versions.

Although nutritionally improved foods generally cost more, their overall volume sales between 1989 and 1993 grew at a faster rate than traditional version foods in the same food category. Market share of nutritionally improved foods showed a steady increase, from

36 percent in 1989 to 39 percent in 1993. Dollar sales also increased from 26 to 30 percent of overall sales. The tendency for nutritionally improved versions to cost more than traditional versions does not necessarily mean that a healthier diet will cost more. Although product-by-product substitution through the use of nutritionally altered versions may result in a more costly diet, simple substitutions can make major dietary improvements affordable. For instance, carrot sticks may be substituted for potato chips or milk for soda, thereby increasing the nutritional profile of the meal while decreasing overall meal cost.

Consumer demand for nutritionally improved (yet tasty) foods is expected to continue. Advances in food technology are likely to accelerate the introduction of nutritious foods that taste and display quality, texture, and functional characteristics similar to their traditional versions.

Source: Frazao, E. and Allshouse, J.E., 1996, *Size and Growth of the Nutritionally Improved Foods Market*, U.S. Department of Agriculture, Economic Research Service, Agriculture Information Bulletin No. 723.

Income of the Elderly, 1994

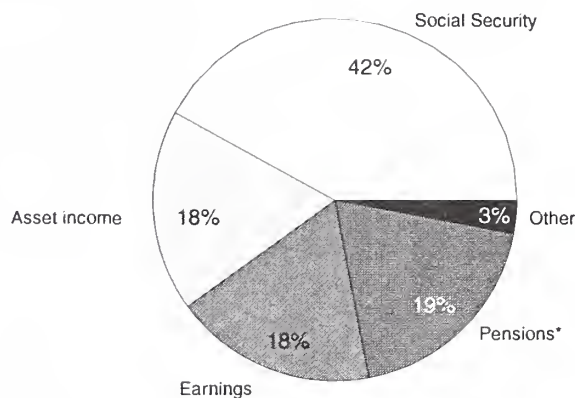
Data collected by the U.S. Department of Commerce, Bureau of the Census, in its Current Population Survey are used by the Social Security Administration (SSA)'s Office of Research and Statistics to determine the economic status of the elderly. The most recent published report contains income data for 1994.

SSA uses the "aged unit" as the unit of analysis rather than *household, family, or unrelated individuals* used by the Bureau of the Census. The aged unit is either a married couple living together with the husband or wife aged 65 or older (generally measured by the age of the husband) or a person 65 years or older who does not live with a spouse. This person may be a widow(er), a divorced or separated person, a legally married person who does not live with a spouse, or a person who never married. By using this unit of analysis, the economic status of the entire noninstitutionalized aged population can be measured separately from that of the family or household in which the unit may live. The 1994 sample represented 9.7 million couples and 14.2 million single units aged 65 or older.

The elderly are an economically diverse group. About 18 percent have an income under \$7,000, which is approximately the 1994 poverty threshold of \$7,108 for one person age 65 or older. Nine percent have an income of \$50,000 or more. The median income of the aged is \$15,094.

Median income is highest for married couples—nearly twice that of nonmarried men and more than 2½ times that of nonmarried women. Whites have a median income more than 80 percent

Social Security and asset income provide the majority of income for the aged



* Includes private pensions or annuities, government employee pensions, Railroad Retirement, and IRA, Keogh, and 401(k) payments.

greater than Hispanics¹ or Blacks. As a result, nonmarried men, nonmarried women, and minorities have the highest poverty rates, ranging from 15 percent for nonmarried men to 31 percent for Blacks. When the near poor² are included, 22 percent of nonmarried men, 34 percent of nonmarried women, 39 percent of Hispanics, and 40 percent of Blacks are accounted for.

Median income decreases with age, reflecting the disproportionate number of nonmarried women in older age groups. Poverty rates (including the near poor) are generally higher for those in the oldest age group, also.

Sources of Income

Social Security is the most common source of income for the elderly and is received by over 90 percent of those age 65 or over. Social Security is the major source of income for 66 percent of the beneficiaries. For 30 percent of the beneficiaries, Social Security contributes at least 90 percent of income; for 16 percent

of beneficiaries, it is the only source of income.

Asset income is the next most common source of income and is received by two-thirds of the elderly. Forty-two percent receive pensions other than Social Security, and 21 percent have earnings. Public assistance is received by 6 percent and veterans' benefits are received by 5 percent.

Social Security plays an essential role in reducing poverty since 42 percent of the elderly are kept out of poverty by their Social Security benefits. Without Social Security, the total poverty rate for the elderly would be 54 percent, rather than 12 percent (the current rate).

The receipt of asset income is associated with relatively high median income. The median income of those with asset

¹Persons of Hispanic origin may be of any race.

²The near poor are defined as having income between the poverty line and 125 percent of the poverty line.

Shares of income by quintiles of total income

Source	Lowest	Second	Third	Fourth	Highest
	<i>Percent</i>				
Social Security	81	81	66	48	23
Pensions*	3	8	14	24	21
Asset income	3	5	10	14	24
Earnings	**	2	6	11	28
Public assistance	11	2	1	**	**
Other income	2	2	3	3	3

* Includes private pensions or annuities, government employee pensions, Railroad Retirement, and IRA, Keogh, and 401(k) payments.

** Less than 0.5 percent.

income is \$20,000 compared with \$8,600 for those with no asset income. Sixty percent of aged units with no asset income have a total income below \$10,000, and only 4 percent have an income of \$30,000 or more. In contrast, 17 percent of those with asset income have total income below \$10,000, and 30 percent have income of \$30,000 or more.

Receipt of earnings and retirement benefits also affects income. Most aged units receive retirement benefits; however, about 6 percent have none. Of these, 35 percent have earnings, and their median income is \$29,900. The remaining 65 percent have no earnings, and their median income is only \$762. Earnings are more common among those 65 to 69 years old (40 percent) than among older groups (age 70-74, 23 percent; age 75-79, 14 percent; age 80-84, 6 percent; and age 85 and older, 3 percent). Also, private pensions and other pensions are more common among the younger groups. Earnings are a more common source of income than either private or other pensions for the youngest group, whereas private pensions are a

more common source of income among the older cohorts.

Receipt of income from major sources varies by race and Hispanic origin. Whites and Blacks are more likely than Hispanics to receive Social Security. Whites are also more likely than Blacks or Hispanics to receive income from assets and from pensions. However, the groups are about equally likely to have earnings. Supplemental Security Income (SSI) is received more often by Blacks and Hispanics than by Whites.

Income Shares

Social Security continues to provide the largest share of total income for the elderly (42 percent) (see figure). The share of total income provided by asset income increased from 1962 (16 percent) to 1984 (28 percent) but has since been declining and is currently 18 percent. The share from other pensions has more than doubled, from 9 percent in 1962 to 19 percent in 1994. The share from earnings has declined from 28 percent in 1962 to 18 percent in 1994.

The shares supplied by each income source differ greatly by income. Aged units were ranked by total income and divided into five groups of equal size (quintiles). The table shows sources of income by quintile. Social Security benefits provide 81 percent of total income for those in the lowest income quintile but only 23 percent of total income for the highest quintile. Public assistance provides the second largest share of income for the lowest quintile (11 percent). For those in the highest quintile, earnings provide the largest share of income (28 percent) followed by income from assets (24 percent).

Income Trends

Median real income has risen approximately 80 percent for married couples and 90 percent for nonmarried persons between 1962 and 1994, even after adjusting for inflation. Since 1967, there were disproportionate increases by race, with income for Whites increasing by 89 percent and that for Blacks by 47 percent.

Since 1962, receipt of Social Security has become nearly universal. In 1962, Social Security was received by 69 percent of the elderly; in 1967, by 86 percent; and in 1994, by 91 percent. Receipt of other pension income has more than doubled since 1962. The proportion of elderly units with asset income increased from 54 percent in 1962 to 66 percent in 1980 and has remained stable since then. The percentage of elderly with earnings declined from 36 percent in 1962 to 21 percent in 1994. The proportion receiving public assistance also declined—from 14 percent in 1962 to 6 percent in 1994.

Source: Social Security Administration, Office of Research, Evaluation, and Statistics, June 1996. *Income of the Aged Chartbook, 1994*. SSA Publication No. 13-11727.

The Home Computer Market

American consumers were expected to purchase 9.5 million personal computers (PC's) by the end of 1995, reaching 39 percent of U.S. households. By the year 2000, it is predicted that between 60 and 65 percent of U.S. homes will have a PC. More than 40 percent of all newly purchased PC's have been going into homes; the home market is said to be growing at least twice as fast as the business market.

Reasons for the Growth in Home-Based Computers

The computer industry has undergone drastic technological advances in recent years. The most important of these is the speed at which computers process data. This change, together with reduced production costs for computer components, has lowered the prices of home PC's. Competition among manufacturers has kept prices down and has helped to encourage purchases of computers for home use. Computer prices dropped by 65 percent from 1988 to 1994.

There is evidence that parents want to expose their children to computers at younger ages. Also, parents are buying PC's for their children in college. Adults who are self-employed or working at home for someone else are shopping for home systems. Of first-time buyers, job-related work at home (44 percent) and children's homework (38 percent) are the major reasons for purchasing a PC.

Characteristics of PC Buyers for the Home

Home use of PC's is growing across all demographic groups. However, a 1993 study by the Bureau of the Census indicates that individuals with at least a bachelor's degree are the most likely to use a PC in the home environment. Other findings show that most home PC users are 35 to 54 years old, the typical family that owns a home PC is a married couple with full-time employment among family members, income of at least \$35,000, and in management and professional- or technical, sales, and administrative support-type jobs.

Because two-thirds of affluent families with children—those with incomes above \$50,000—already have a PC, computer manufacturers need to entice moderate- and low-income families into the market. Profit margins are so low (about 1 percent) that they probably can't be cut any further. Many firms believe the home PC "boom" cannot last, citing a survey that found only 5 percent of households lacking a PC were "extremely likely" to buy one in the next 6 months.

From the PC Industry Perspective

The PC industry (computers, peripherals, and software distribution) lost a total of 38,000 jobs between 1991 and 1993; however, since 1995, 32 percent of these jobs have been restored. Credit for this recovery may be attributed to improved home PC sales and the introduction of Windows®95. Employment in the retailing sector had a growth rate of 11 percent in 1994. Because the business PC market is at a 90-percent saturation rate, this

employment growth likely reflects not only the strength of the economy but also increased business due to the use of home PC's.

New home computer buyers are investing in PC products that will give them maximum productivity as they work and peak enjoyment as they learn and play. Manufacturers believe the key is to make the computer simple to use and with multipurpose applications. Multimedia systems with modems, fax capabilities, printers, CD-ROM drives, answering machines, stereo speakers, and preloaded software give users a complete system that is "ready to go."

Manufacturers are also counting on replacement sales. Even though 25 percent more consumers purchased computers for their home in 1995 than in 1994, replacement sales to home-PC owners looking for the latest technology cannot be expected to continue unabated when current Pentium models can be easily upgraded with the latest chip.

The Software Industry

U.S. firms have been the unquestioned leader in the software industry since its inception in the 1970's. Fortunes have been made, along with thousands of jobs. The prepackaged software industry employs almost 200,000 individuals. In 1995 alone, 25,000 jobs were added—a 15-percent increase—reflecting increased sales from home PC users.

In 1994, sales of computer application software reached \$7.38 billion. Word processor and spreadsheet software remain the largest application categories. Price declines, however, limited revenue growth. Home education software had the largest percent increase during 1994

(up 88 percent), followed by entertainment (up 56 percent). Together, these imply more purchases from the home PC user.

PC application software used to be the only gauge of growth in the software market, until the CD-ROM (compact disc read-only memory) became popular. The circular discs store vast amounts of data and are capable of multimedia uses that combine numerous elements such as text, still photographs, audio, and video. Sales of CD-ROM's are surging among home PC consumers due to the decreasing prices of computers with CD-ROM capability, and a widening array of uses for the discs. The consumer CD-ROM market was slow to develop, in part because software manufacturers were hesitant to design products when so few computer owners had CD-ROM drives. When prices for upgrade kits (which allow owners to fit CD-ROM drives onto existing machines) were lowered, consumers bought the necessary hardware and manufacturers responded by producing thousands of titles. Prices of CD's are also dropping, and computer manufacturers are including CD-ROM drives as standard equipment on personal computers.

Information Retrieval Services

What began as an experimental network of three computers linking the Department of Defense, military research contractors, and universities involved in military-funded research—called the ARPAnet (Advanced Research Projects Administration network)—has now grown into what is widely known as the Internet. Since 1993, the Internet has become a new public forum through the multimedia side of the net, called the World Wide Web. This combination of special software and a unique way of connecting

documents allows users to “surf the net.” This new medium is not just based on broadcasting and publishing but has an interactive component as well.

The Internet has doubled in size each year since 1988. It now reaches nearly 5 million host computers, each of which may connect to several individual users. In just 18 months, users created more than 3 million multimedia pages of information. The range of customers who use the Internet includes U.S. grade school students exchanging letters with children in other countries; college students researching term papers; homemakers doing their banking or shopping; office workers transmitting data; and corporate marketing departments promoting their products. Access to the Internet is most often via on-line information services.

As more businesses and home PC users become aware of the advantages the Internet offers, on-line services will become a larger proportion of the information retrieval services industry. Most on-line information services provide users with a link to the hundreds of schools, businesses, and other institutions that have set up home pages on the Internet, with graphics and hypertext.¹ Home pages can be created by anyone and allow users to obtain information on a variety of topics, “meet” others with similar interests, or place electronic orders for goods. Selling through the Internet offers small companies a level playing field against larger, national retailers. Retail sales through on-line services such as America On-line, Prodigy, CompuServe, and Microsoft Network were estimated to be several hundred million dollars in 1995.

¹Home pages are a table of contents that let users point and click with a computer's mouse in order to retrieve information; hypertext is the format in which the information is written.

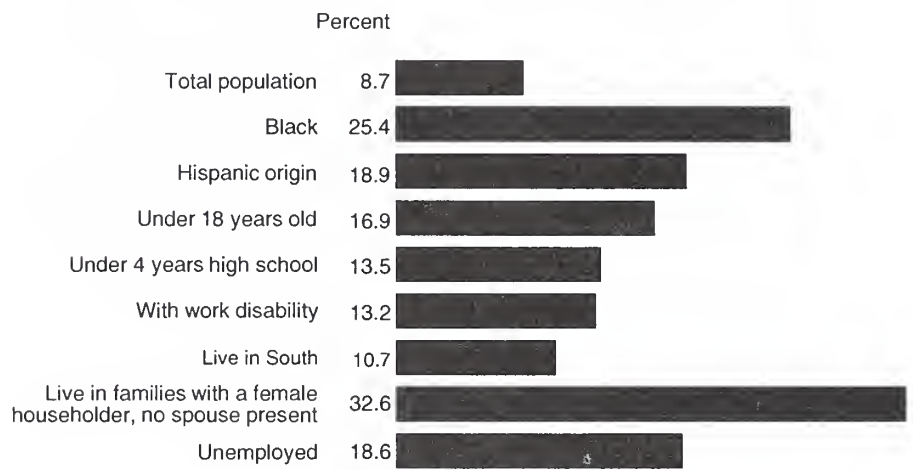
Only one-third of all PC users are logging on, leaving tremendous room for growth. Sending and receiving electronic mail and downloading software or files are the major on-line activities of both the home and workplace users. However, home users are more likely to use on-line services for interactive chat activities and as a gateway to the Internet.

Home use of the Internet and on-line services is expected to expand threefold by the year 2000. In turn, the Internet will evolve to support a level of business activity as yet impossible. Companies that have personnel taking information or payments will instead have the customer's computer on-line. New technologies are expected to facilitate the delivery of information services to new users: High-speed wireless networks will offer hassle-free access to data; multimedia will make shopping at home attractive and painless—people can see what they are purchasing and place an order without filling out a form or talking to a person; and users of intelligent phones (automatic call forwarding and message services), personal digital assistants (portable, handheld computers that have telephone, fax, e-mail, and paging capabilities), and interactive TV's can also be on-line.

Source: Freeman, L., 1996, Job creation and the emerging home computer market, *Monthly Labor Review* 119(8):46-56.

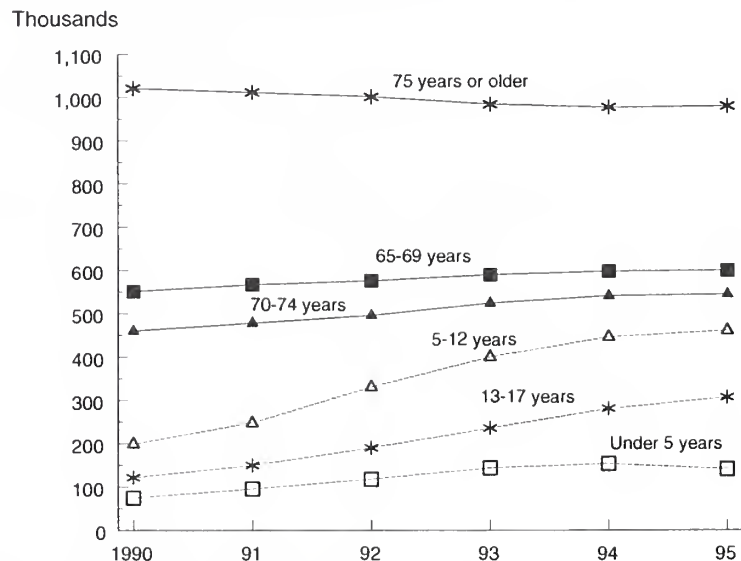
Charts From Federal Data Sources

Average monthly food stamp participation rates, selected population groups, 1993



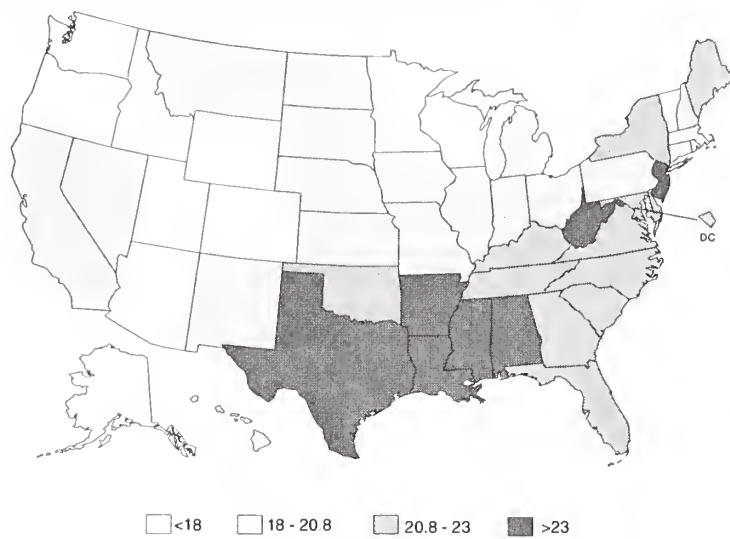
Source: Tin, J., 1996, *Dynamics of Economic Well-Being: Program Participation, 1992-1993, Who Gets Assistance? Current Population Reports, Household Economics Studies, P70-8*, U.S. Department of Commerce, Bureau of the Census.

Supplemental Security Income (SSI): Number of persons eligible by selected age categories, December 1990-95



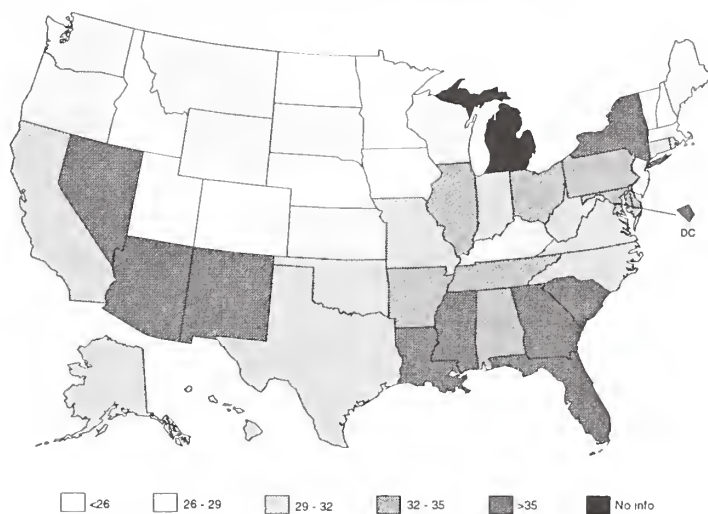
Source: Social Security Bulletin 59(2), 1996.

Percent of live births by cesarean delivery, 1995



Source: Rosenberg, H.M., Ventura, S.J., Maurer, J.D., Heuser, R.L., and Freedman, M.A., 1996, *Births and Deaths: United States, 1995, Monthly Vital Statistics Report 45(3), Supplement 2*.

Percent of live births to unmarried mothers, 1995



Source: Rosenberg, H.M., Ventura, S.J., Maurer, J.D., Heuser, R.L., and Freedman, M.A., 1996, *Births and Deaths: United States, 1995, Monthly Vital Statistics Report 45(3), Supplement 2*.

Recent Legislation and Regulations Affecting Families

Public Law 104-199 (enacted September 21, 1996)—the Defense of Marriage Act defines the institution of marriage. No State can be required to give full faith and credit to a same-sex marriage performed in another State. The Federal Government will recognize as a marriage only the legal union between one man and one woman, and only a spouse of the opposite sex is entitled to benefits under any program.

Public Law 104-210 (enacted October 1, 1996)—the Bill Emerson Good Samaritan Food Donation Act encourages the donation of food and grocery products to nonprofit organizations for distribution to needy individuals by giving the Model Good Samaritan Food Donation Act the full force and effect of law. A person who donates apparently wholesome food or food products in good faith to a nonprofit organization for redistribution to needy persons cannot be held criminally or civilly liable should such food or food products cause harm to recipients; nor can the nonprofit organization be held liable.

Public Law 104-231 (enacted October 2, 1996)—the Electronic Freedom of Information Act Amendments of 1996 amends the Freedom of Information Act to provide for public access to information in an electronic format. Agencies of the Federal Government are required to make certain information available for public inspection and copying.

Public Law 104-299 (enacted October 11, 1996)—the Health Centers Consolidation Act of 1996 amends the Public Health Service Act to consolidate four health center programs (community, migrant, homeless, and public housing). The law reauthorizes them through the

year 2001 and authorizes a loan guarantee program to enable health centers to join integrated service networks.

Regulation B, *Equal Credit Opportunity* (effective September 30, 1996)—revisions amend the rules concerning evaluation of applications. Specifically, age may be taken into consideration in a credit scoring system that is “demonstrably and statistically sound” with one limitation: applicants 62 years or older must be treated at least as favorably as applicants who are under 62. If age is scored by assigning points to an applicant’s age category, elderly applicants must receive at least as many points as the most favored class of nonelderly applicants; but a reverse mortgage program¹ that requires borrowers to be age 62 or older is permissible, and a creditor may consider a borrower’s age to evaluate a factor of creditworthiness, such as the amount of the credit or monthly payments that the borrower will receive.

Regulation Z, *Truth in Lending* (effective October 21, 1996)—the revisions incorporate changes made by the Truth in Lending Act Amendments of 1995. The amendments establish new creditor-liability rules for closed-end loans secured by real property or dwellings and consummated on or after September 30, 1995, and clarify how lenders must disclose certain fees connected with mortgage loans.

¹A reverse mortgage is a home-secured loan in which the borrower receives payments from the creditor and is not obligated to repay these amounts until the borrower dies, moves permanently from the home or transfers title to the home, or upon a specified maturity date. Disbursements are determined by considering the value of the borrower’s home, the current interest rate, and the borrower’s life expectancy.

Regulation M, *Consumer Leasing* (issued September 25, 1996; effective October 1, 1997)—the Federal Reserve Board finalized the regulation that simplifies and clarifies required disclosures for car leasing and other types of consumer lease transactions. Increased use of automobile leasing, and the Board’s policy of periodically reviewing its regulations to carry out the purpose of the underlying law more effectively, precipitated the revisions. Among the provisions:

- Adopt a total of payments disclosure to facilitate comparisons
- Revise the disclosure of costs paid at lease signing to make it easier for a consumer to understand the amounts to be paid and how they are allocated
- Require a mathematical progression that shows how the monthly lease payment is calculated and the relationship of terms such as the “capitalized cost” and the “residual value” of the leased property
- Require narrative warnings about possible charges for terminating a lease early and for excess wear and tear
- Require changes in advertising rules to implement statutory amendments, simplify disclosure requirements, and deter misleading advertising
- Require a disclosure to accompany any percentage rate indicating the limitations of rate information.

Research and Evaluation Activities in USDA

From the Food and Consumer Economics Division, Economic Research Service

New Report

A new report on children's diets was published in December 1996 by USDA's Economic Research Service, *The Diets of America's Children—Influences of Dining Out, Household Characteristics, and Nutrition Knowledge*. Written by staff in the Food and Consumer Economics Division and in the Center for Nutrition Policy and Promotion, the report uses data from the 1989-91 Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey to examine various aspects of children's diets: Intakes of food energy, fat, cholesterol, sodium, fiber, iron, and calcium as well as eating patterns for meals and snacks, food away from home, and weekdays and weekends.

The report analyzes children's nutrient intakes according to their social, economic, and demographic characteristics as well as their meal planners' knowledge about diet and health issues. The report also presents the average values of nutrient consumption and related variables for children by age and gender and by food sources.

Principal findings include:

- Children's diets were high in total fat, saturated fat, and sodium and low in food energy and fiber

- Female adolescents' diets were also low in calcium and iron.
- Compared with other children, female teens had the highest tendency to skip morning meals (high in calcium and iron), ate the smallest number of meals and snacks, had the largest proportion of meals and snacks away from home (low in fiber, iron, and calcium), and drank the least fluid milk
- Compared with home foods, higher levels of total fat and saturated fat and lower levels of cholesterol, dietary fiber, calcium, iron, and sodium were found in away-from-home foods eaten by children
- More than half of all children ate three meals each day, and the number of meals decreased with age
- One-quarter of meals consumed by children ages 2-17 were away from home
- Home foods provided 72 percent of food calories to all children
- Female adolescents had the largest share of calories away from home at 33 percent
- Compared with other children, those with college-educated meal planners (who tend to have higher incomes and are more likely to be employed than less educated individuals) had lower levels of total fat, saturated fat, and cholesterol.

The report concludes that to improve children's diets, intakes of some nutrients and food components (e.g., fiber, calcium, and iron) need to be increased, whereas intakes of others (e.g., fat, saturated fat, cholesterol, and sodium) need to be limited. Knowledge—and awareness of diet-health relationships—is effective in increasing intakes of “underconsumed” food components but not so effective in limiting intake of “overconsumed” components. Label reading, however, is associated with both decreased intake of overconsumed and increased intake of underconsumed components. Because dining out is increasing among people of all ages, there is a real concern that this trend will thwart the food planner's ability to control what the family eats, how it is prepared, and thus, the nutrient quality of its diets.

Copies of the report (Agricultural Economic Report Number 746) may be purchased for \$9.00 per copy from ERS-NASS, 341 Victory Drive, Herndon, VA 20170-5217.

Data Sources

National Survey of Small Business Finance (NSSBF)

Sponsoring agency: Federal Reserve Board and the U.S. Small Business Administration

Population covered: Small businesses

Sample size: 3,145 respondents representing 3.2 million firms in 1987 and 5,237 respondents representing 4.9 million firms in 1993.

Geographic distribution: Nationwide

Years data collected: 1987 and 1993

Method of data collection: Computer-assisted telephone interviews.

Future surveys planned: The next survey is expected to take place in 1998.

Major variables: The 1987 survey focused on the definition of banking markets, whereas the 1993 survey focused on the availability of credit to small and minority-owned businesses. Both surveys collected information on firms' finances, including sources and types of financial services used; bank and nonbank shares of the small business credit market; use of six types of credit—credit lines, mortgage loans, equipment loans, motor vehicle loans, capital leases, and "other" loans; and demographic characteristics of small businesses.

Sources for further information and data:

Federal Reserve Board
Washington, DC 20551
(202) 728-5852

National Health Interview Survey (NHIS)

Sponsoring agency: U.S. Department of Health and Human Services

Population covered: Civilian, non-institutionalized population of the United States

Sample size: 46,000 households with 116,000 persons for 1994

Geographic distribution: Nationwide

Years data collected: Annually since 1957

Method of data collection: Personal interviews.

Future surveys planned: The 1995 survey is expected to be available in 1997.

Major variables: The survey consists of a set of basic health and demographic items and one or more sets of questions on current health topics. Basic health variables include: Number of conditions (acute and chronic), self-assessed health status, limitation of activity, short-term disability, height and weight, hospitalization, and doctor visits. Demographic variables include: Age, race, sex, Hispanic origin, education, family income, marital status, and region. For 1994, the following special topics were included: Childhood immunizations, disability, family resources, year 2000 objectives, and acquired immunodeficiency syndrome knowledge and attitudes.

Sources for further information and data:

Centers for Disease Control and Prevention
National Center for Health Statistics
6525 Belcrest Road
Hyattsville, MD 20782
(301) 436-8500
Internet: <http://www.cdc.gov/nchswww/nchshome.htm>

Journal Abstracts

The following abstracts are reprinted verbatim as they appear in the cited source.

Colavito, E.A., Guthrie, J.F., Hertzler, A.A., and Webb, R.E. 1996. Relationship of diet-health attitudes and nutrition knowledge of household meal planners to the fat and fiber intakes of meal planners and pre-schoolers. *Journal of Nutrition Education* 28(6):321-328.

The relationship of household meal planners' diet-health attitudes and nutrition knowledge to their fat and fiber intakes and to the intakes of 2- to 5-year-old children in the households was examined using data from the 1989-91 Continuing Survey of Food Intake by Individuals and Diet Health Knowledge Survey (CSFII/DHKS). Selected households (n=478) provided 24-hour diet recalls and the households' main meal planners responded to the DHKS. Meal planner attitude variables were defined according to the Health Belief Model and selected CSFII/DHKS questions served as proxy measures. The relationship of meal planners' attitudes and knowledge to meal planners' and children's fat and fiber consumption at home and in the total diet was analyzed using multiple regression. Several diet-health attitude variables were significantly related to meal planners' fat and fiber intakes and relationships were similar for foods eaten at home and for foods eaten in the total diet. Knowledge was significantly related to meal planners' and children's home fat intake ($p<.05$) but the relationships failed to reach statistical significance for the total diets. Meal planners' taste concerns differed significantly in their relationship to

meal planners' and children's fiber consumption ($p<.05$). Results indicate that parents' diet-health attitudes are more influential in their diets than in the diets of preschoolers. Findings also suggest that taste and practical food concerns are significant barriers to healthy eating among younger adults and that general nutrition knowledge may not be as helpful in making healthy food choices outside the home as it may be in the home setting.

Michael, R.T. 1996. Money illusion: The importance of household time use in social policy making. *Journal of Family and Economic Issues* 17(3/4):245-260.

The paper discusses the reasons for and the implications of the fact that social science does not adequately measure the uses of time or the products of its use. This is called a "money illusion" because typically we focus on the monetary component of many issues, ignoring the equally important time component because it is difficult to quantify. This money illusion affects policy decisions, which are based on faulty or less than complete information. The paper details several examples, including measuring income growth and its distribution; assessing poverty status; calculating family investments in children; setting child support guidelines; assessing the benefits of marriage; and understanding adult sexual behavior.

Stuhldreher, W.L., Zuchowski, D.Z., and Liddel, M. 1996. Family and consumer sciences teachers: Promote healthful eating for the year 2000. *Journal of Family and Consumer Sciences* 88(3):3-8.

Achievement of many Healthy People 2000 goals is feasible if the USDA Dietary Guidelines are adopted by more Americans. This survey of West Virginia family and consumer sciences educators was conducted: 1) to determine the incorporation of Dietary Guidelines into the total curriculum; and 2) to assess the adequacy of educator's preparation for implementation. All West Virginia family and consumer science educators (N=355) were surveyed and 117 responded (31%). Results indicated the majority of educators were implementing the guidelines into the total curriculum with the most consistently implemented guidelines being eat a variety of foods, and choose plenty of vegetables/fruits and grains. Laboratory recipes were modified to reflect the guidelines. Adequacy of educational preparation to promote Dietary Guidelines was positively correlated with ease of implementation, thus family and consumer sciences educators in West Virginia are an integral part of the educational team guiding youth in developing healthful eating patterns.

Cost of Food at Home

Cost of food at home estimated for food plans at four cost levels, March 1997, U.S. average¹

Sex-age group	Cost for 1 week				Cost for 1 month			
	Thrifty plan	Low-cost plan	Moderate-cost plan	Liberal plan	Thrifty plan	Low-cost plan	Moderate-cost plan	Liberal plan
FAMILIES								
Family of 2: ²								
20 - 50 years	\$56.70	\$71.70	\$88.30	\$110.10	\$245.60	\$310.80	\$383.10	\$477.40
51 years and over	53.40	69.10	85.30	102.20	231.20	299.00	369.50	442.90
Family of 4:								
Couple, 20 - 50 years and children—								
1 - 2 and 3 - 5 years	82.30	103.30	126.20	155.40	356.80	447.50	547.10	673.60
6 - 8 and 9 - 11 years	94.60	121.60	151.50	182.80	410.40	526.80	656.90	792.30
INDIVIDUALS³								
Child:								
1 - 2 years	14.80	18.20	21.30	25.80	64.10	78.80	92.20	111.90
3 - 5 years	16.00	19.90	24.60	29.50	69.40	86.20	106.60	127.70
6 - 8 years	19.70	26.40	32.90	38.30	85.50	114.40	142.50	166.00
9 - 11 years	23.40	30.00	38.30	44.40	101.60	129.90	166.10	192.30
Male:								
12 - 14 years	24.30	33.90	42.00	49.40	105.40	146.80	182.00	214.10
15 - 19 years	25.10	34.90	43.40	50.20	108.60	151.20	188.20	217.50
20 - 50 years	27.10	34.70	43.30	52.50	117.40	150.50	187.80	227.70
51 years and over	24.40	33.20	40.80	49.00	105.90	143.60	176.70	212.20
Female:								
12 - 19 years	24.20	29.20	35.40	42.80	105.00	126.60	153.60	185.70
20 - 50 years	24.40	30.50	37.00	47.60	105.90	132.00	160.50	206.30
51 years and over	24.10	29.60	36.70	43.90	104.30	128.20	159.20	190.40

¹Assumes that food for all meals and snacks is purchased at the store and prepared at home. Estimates for the thrifty food plan were computed from quantities of foods published in *Family Economics Review* 1984(1). Estimates for the other plans were computed from quantities of foods published in *Family Economics Review* 1983(2). The costs of the food plans are estimated by updating prices paid by households surveyed in 1977-78 in USDA's Nationwide Food Consumption Survey. USDA updates these survey prices using information from the Bureau of Labor Statistics, *CPI Detailed Report*, table 4, to estimate the costs for the food plans.

²Ten percent added for family size adjustment. See footnote 3.

³The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person—add 20 percent; 2-person—add 10 percent; 3-person—add 5 percent; 5- or 6-person—subtract 5 percent; 7- or more-person—subtract 10 percent.

Consumer Prices

Consumer Price Index for all urban consumers [1982-84 = 100]

Group	Unadjusted indexes			
	March 1997	February 1997	January 1997	March 1996
All items	160.0	159.6	159.1	155.7
Food	156.6	156.5	156.5	151.6
Food at home	157.7	157.7	157.9	152.5
Food away from home	156.0	155.6	155.3	151.2
Housing	155.9	155.8	155.1	151.7
Shelter	175.2	174.6	173.6	170.1
Renters' costs ¹	186.8	185.3	182.7	180.4
Homeowners' costs ¹	179.8	179.5	179.1	175.0
Household insurance ¹	163.3	163.8	162.6	159.1
Maintenance and repairs	142.4	142.3	141.5	137.5
Maintenance and repair services	148.4	148.4	148.2	143.8
Maintenance and repair commodities	134.3	133.9	132.5	129.0
Fuel and other utilities	129.9	131.0	130.8	125.2
Fuel oil and other household fuel commodities	105.5	109.6	111.5	99.3
Gas (piped) and electricity	123.4	125.3	124.9	118.2
Household furnishings and operation	125.4	125.2	124.9	124.6
Housefurnishings	111.1	111.2	110.8	111.7
Apparel and upkeep	134.5	131.9	129.6	134.8
Apparel commodities	131.0	128.2	125.8	131.6
Men's and boys' apparel	129.2	127.3	127.0	129.1
Women's and girls' apparel	130.1	126.1	121.5	129.9
Infants' and toddlers' apparel	129.7	127.2	127.9	133.3
Footwear	127.0	126.3	125.0	128.1
Apparel services	162.4	162.2	161.7	158.9
Transportation	144.9	144.8	145.0	141.2
Private transportation	141.5	141.9	141.8	138.3
New vehicles	145.4	145.4	145.4	143.6
Used cars	154.4	154.4	154.7	157.3
Motor fuel	106.4	108.1	108.6	101.4
Maintenance and repairs	161.5	161.2	161.1	156.9
Other private transportation	177.4	177.1	176.2	172.5
Public transportation	188.1	182.4	185.8	178.9
Medical care	233.4	232.7	231.8	226.6
Medical care commodities	214.7	213.9	212.8	208.9
Medical care services	237.7	237.1	236.3	230.7
Professional medical services	214.2	213.2	212.2	206.5
Entertainment	162.1	161.8	161.3	158.4
Entertainment commodities	144.5	144.3	144.2	142.7
Entertainment services	182.7	182.1	181.3	177.0
Other goods and services	221.4	220.7	220.0	213.0
Personal care	151.8	151.5	151.6	149.4
Toilet goods and personal care appliances	143.6	143.3	143.6	144.0
Personal care services	161.2	160.7	160.7	155.3
Personal and educational expenses	255.8	255.0	254.0	244.1
School books and supplies	235.4	235.3	234.5	225.2
Personal and educational services	257.6	256.7	255.8	245.7

¹Indexes on a December 1982 = 100 base.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

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